

HEIGHT
5FT. 8 IN.
WEIGHT
160 LBS.

NECK
15 1/4 IN.

CHEST
40 IN.

WAIST
31 IN.

THIGH
22 IN.

CALF
14 3/4 IN.

ANKLE
8 1/2 IN.

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SKINNY MEN

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*Thousands gain 5 to 15 lbs. in a few weeks
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2 greatest body-builders in 1

This amazing new product, Ironized Yeast, is made from specially cultured *brewers' ale yeast* imported from Europe—the richest yeast known—which by a new scientific process is concentrated 7 times—made 7 times more powerful.

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Day after day, as you take pleasant little Ironized Yeast tablets, watch flat chest develop, skinny limbs round out attractively, complexion clear—you're an entirely new person.

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THE
ULTIMATE
METAL

by Nat Schachner

The only man
who could talk
to the
Superintendent



For several years, he was just like a score of other men in the plant—a good, honest, fairly capable worker, but only that. There was nothing distinctive about him or his ability—nothing to make him stand out from the crowd—no reason, as a matter of fact, why he should ever receive a raise.

Then one fortunate day he decided that the reason he wasn't getting anywhere was because he lacked special training. He searched around a bit—asked a great many questions—and then enrolled for a home-study course with the International Correspondence Schools.

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men who had really studied their work were in line for positions as foremen.

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VOLUME XIV
NUMBER 6

ASTOUNDING STORIES

FEBRUARY
1935

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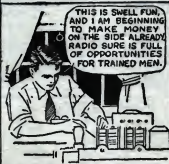
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Study the picture of the country road and see if you can find ten of the hidden faces. Sharp eyes may find them. Some of them look straight at you, some are upside down, others are sideways. Look for them in the clouds, tree, around the dog's legs, in the bushes, etc.. It is not as easy as some people may think. Don't give up—keep looking and you may find them.

Hurry—mark the faces you find. This gives you the opportunity to win \$2,250.00. Send your answer quick. Don't delay. Mail your answer today.

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Send answer quick and we will tell how the winner can get \$1,250.00 extra cash FOR PROMPTNESS

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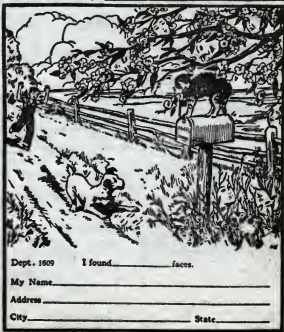
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*Illustrated
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DISCUS MEN

A powerful sequel to "Warriors of Eternity"

by Carl Buchanan
and Dr. Arch Carr



OF EKTA

THE NUDE BODY of a perfectly formed young man lay upon the examining table near the center of the biological laboratory room. The eyelids were loosely closed, the facial muscles relaxed in an expres-

sion of utter serenity. The massive chest rose and fell slowly, steadily, in the measured respiration of a peaceful sleeper. There was no other outward sign of life.

Dr. Paul Britten, thin, aged, nodded

The great bodies soared high into the air, came crashing down with terrific force.

his white-thatched head with satisfaction. A binaural stethoscope had just brought to his sensitive ears sounds that bespoke powerful and perfect vital organs in that body on the table before him. A sphygmomanometer had indicated blood pressure normal to a man of twenty-seven, the age of the man who had never laughed, spoken, wept, cried in pain, nor had a moment of consciousness in the years of his cumulative being.

For the body was that of a synthetic man. There remained now, as the final and possible crowning effort of Dr. Britten's career, only the delicate process of stimulating brain cells and nerve centers with high-frequency electrical current in order to bring about complete consciousness in the body.

A lifetime of painstaking research and labor had created the body. Every organ, gland, and motor nerve functioned normally. True, consciousness did not yet exist. The being's centers which control the ordinary automatic functions of a normal body had been motivated; there yet remained the task of obliterating the mental darkness of the synthetic brain; of exciting, by means of the unique application of electrical energy, a sense of consciousness, of intelligence, of awareness, in the perfect body.

Dr. Britten worked feverishly, now, and swiftly. Sweat gathered upon his pale forehead, ran down his withered cheeks. In just a few minutes he would realize the most astounding success ever obtained by science, or be crushed beneath the blow of ignominious failure.

His long, clawlike fingers trembled as he affixed a brass electrode to the synthetic man's head. Other smaller but similar clamps were placed about the arms, thighs, and ankles, and the attendant wires aligned.

Britten then turned to a small control panel near by, snapped a switch and leaned forward to peer nearsightedly at a delicately fluctuating needle. He slid a starting handle forward toward maxi-

mum, not so slow as to burn out the series resistances, nor so fast as to injure the fields of the motor. In a corner of the laboratory a huge motor-generator set sprang into humming life, quickly adjusted itself to the load, settled smoothly upon a single weird and whining note.

The aged doctor, pulses hammering at his temples, breath rasping in his dry, thin throat, moved closer to the table to view at close range whatever result should presently appear. His mind was a maelstrom of conflicting thoughts, speculations, fears.

What would be this man's first reaction to sight of a strange world? Would he become instantly like a frightened animal, his brain cowering under the harsh bombardment of his reflexes? What would he first say—think?

But no! He would not speak at once, because he would have no knowledge of sound, of language. He would be like a child. He would have to be taught even the simplest acts, the simplest things.

There might, Britten considered with sinking heart, be no reaction whatever to the electrical impulses now thronging the cells of the synthetic brain. Britten's mind charged back through the years—the long, hard years—to the day when he had first succeeded in creating vitality, pregnancy, expectancy, in a vat of protoplasm. He thought of the years of wasted effort in trying to create epithelium, of the tedious, heart-shattering work that had been necessary in bringing about ossification in the cartilaginous substance he had caused to grow in his devised media.

He remembered with awful clarity, now that the years of toil lay upon the balance between success and utter failure, how he had failed year after year in keeping his masses of cells alive until they could grow, under his attentive direction, into the perfectly formed organs now possessed by the synthetic

man. He remembered his failures at creating the folded masses of the brain; his brilliant successes of achieving, little by little, knowledge which had at last carried him through to realization of the preparatory work on his lifelong dream.

The brain was there now—he must make it respond, make it live.

Suddenly Britten gasped. He leaned forward, his eyes wide.

The eyelids of the man on the table stirred faintly, fluttered, opened. One of the hands lifted, fell back again. The torso stirred as if in tiny reaction to spreading pain.

Britten stared into the eyes of the man. They were blue, perfectly made. They would be able to bring shadow and light, color, to the brain of the synthetic man, as soon as that brain stirred from its dark lethargy.

The man's head rolled slowly from side to side. Britten leaned closer to the eyes of perfect mechanical coronas, irises, pupils, and retinas. There, Britten knew, would appear the first hint of intelligence—the first inkling that his life's work had not been in vain. For without intelligence this created man would be only evidence of a man's skill in directing the processes of nature. If intelligence could be implanted in this human body, then science, indeed, approached the fountainhead of Deity.

"He is beginning to live," Britten whispered through palsied lips. "The respiration rate is mounting, the pulse is stronger. He is beginning to know that he exists, that there is life about him."

And then it happened. The eyelids of the synthetic man closed. The body grew still, lapsed into immobility.

Failure!

BRITTEN raised his hands high, his fists clenched. Into his brain there plunged a dark river of despair. His heart became like lead, and upon his

lips there sprang a single, choked and desperate cry of utter anguish.

He turned dejectedly toward the panel, cut out the switch. The experiment had failed. The man still lived, a mindless automaton; the brain had not responded to the excitation of the electrical current.

Dr. Britten sank into a chair, his eyes glassy, his spirit crushed. All the hard, hermitlike years descended upon him with heart-crushing vehemence. All the patience, the research, the untiring labor of his life was as nothing, now that inspiration had died, now that his body was a shell of dark despair before this failure.

His creation of a perfect body, his unassisted contribution to science, now meant less than nothing. No one would believe him. Fellow scientists, whom he had meant to call into view his finished work, would laugh at him, probably accuse him of having destroyed the intelligence of some living person, of foisting that person upon the world as a synthetic being. For it would require years of work to show the world what he had done, to show his fellow scientists—

Britten laughed—and it was the sound of madness.

He got to his feet, his face contorted with frustration. What cared he for what his fellows would think? He would probably, even had he been successful in creating intelligence in his synthetic man, have been accused of trickery. None of these things mattered. He wanted that man to attain the full stature of life—this was all that counted.

He walked toward the table, stared down at his creation with dejected eyes.

For the first time in all his years of conscientious effort he realized that he needed help, the physical assistance of a fellow scientist. He had received help before from all those men who had journeyed far into the realm of the crea-

tion and nurturing of epithelium, but only from the records of their experiments. His work had been accomplished alone; no man knew his secrets.

Somewhere there must be a scientist, a man of medicine, who would understand this work, who would be willing to give, and capable of rendering, assistance. Somewhere there must be a fellow scientist who would not draw back from this experiment; would not think, as so many dogma-bound men did, that this was meddling with things forbidden to man.

"There was a man," Britten said to himself, his eyes dark with regret, "who would have understood—who could have helped me—would have understood that science must strip itself of the superstition of ignorance and dare unscalable heights."

But that man was dead, murdered by his assistant.

Britten raised his hands in supplication, his brain searching for an answer to his problem.

"If Dan Futrell had only lived! If only he had not been victimized by the murderous jealousy and greed of Wilks Hurd! Dan Futrell! There was the great scientist who had not been afraid to lay his own body upon the altar of sacrifice; to offer it up in a disastrous attempt at atonement for all the useless pain that science has unwittingly allowed humanity to suffer. The perfect anaesthesia! Futrell, did you find what you searched for?"

Britten's face glowed with strange anticipation. Arms thrust overhead, his eyes staring at and beyond the low ceiling of the laboratory, he seemed caught up into weird ecstasy, into a strange attitude of sublimation.

He cried, his voice laden with grief: "You, Futrell, if, somewhere, your mind still lives, must know what I cannot discover. You must hold the key which will unlock the dark door of the prison in which this body lies. You learned

how to release the intelligence of the human mind; your own intelligence must have been catapulted into space and time upon that dark day when the savagery of lust in Hurd's body blasted your body into death with a touch of his hand upon the control panel of that now useless machine you created. Why did you risk your life in the hands of the man whose insane jealousy you should have seen? I need you! If you can speak with me across that formless void of eternity which separates us——"

THERE was the sharp sound of dissolution in Britten's brain, as if his hysteria had reached that point at which his nerves had broken. He lowered his hands, his mind strangely dark with expectancy and dread.

"I am not going mad," he mumbled, retreating to fall back listlessly into the chair.

His withered hands twisted one upon the other. He stared blankly before him, waiting, hoping——"

If Britten slept he did not know it, but presently he opened his eyes, his brain quite clear. He gasped, got to his feet, retreated in wild astonishment.

The nude body of the synthetic man stood erect before him, a smile on the face.

Britten continued to retreat, crouching, one hand brushing across his bewildered eyes. "No; this is not true! It cannot be!" he cried.

The man raised his right hand, extended it before him in a gesture that held both invitation and compassion.

The lips of the man moved, and sound came forth:

"Here is your success, Paul, your pinnacle of victory! You did not know that your years of labor were for the purpose of creating a body in which I could return to Earth, but it is true. I have watched you with hopeful eyes for a long time, because great trouble has

come to my people and you must help us."

Britten failed in his effort to force speech to his palsied lips. What had happened? This strange intelligence which had come into the body of the synthetic man! This man who spoke the facile, liquid tones of the English language! This being that called him "Paul"!

"Give me your hand, Paul," the man commanded. "And cast off the ugly garment of fear that ill becomes a man who dared the slurs and jests of his contemporaries."

Britten lifted his shoulders, thrust forth his hand. The hand of the other closed hard. An exuberance of joy swept over the old scientist. His eyes stared into the blue, intelligent eyes of the man. His hand twisted beneath the steady clasp of the hand he had built up with such painstaking care.

"But I do not understand," he cried. "Cannot understand. I am afraid, because this thing which I see is not of science, but of legerdemain, of charlatantry. I did not create this intelligence which inhabits your body."

"You called me," returned the man, smiling. "And I came. Do you remember, Paul, the linden trees at Heidelberg? The long lazy afternoons on the river? The dreams we scrawled high upon the crags of distant Reinschloss Castle?"

Britten's face suddenly became alive with a spray of nerve reaction, as if his face was drenched with icy water. Something at once exciting and touching crowded into his shaking heart. Heidelberg! The distant crags of Reinschloss through the purple haze of afternoon! There was only one man who would think to remind him of those golden days of study in Germany. Only one, and he—

Britten leaned forward, his pale face masked with bewilderment. His voice, trembling with uncertainty, with aston-

ishment and unbelief, sounded unnatural when he said:

"Futrell? No—it can't be! I know that Futrell——"

"My friend," said the other solicitously, his voice sober with deep feeling yet soaring with exuberant joy, "I am Dan Futrell. This body you have made is now my body; my intelligence has entered into it, has possessed it. That I feel only the smallest sensation of inconvenience, and that the adjustment was accompanied by not the slightest trouble, only proves the superior quality of your work. I have tried before to come back to Earth, but it is only now that your work has reached that point at which I could accomplish my objective."

Daniel Futrell stepped quickly across the room and caught up a robe that lay upon a chair. He swept it with a gesture of ease about his shoulders, draped it beneath his arms so that only his clean, naked breast was visible. Britten watched the simple act with a feeling of awe, almost of reverence.

Futrell, clothed in the new body, leaned back against the examining table, threw back his head, laughed boisterously. "Oh, my friend, it is good to possess a new body—one which is not old!"

"I do not understand, Dan," said Britten. "You wrapped the new body of yours in that robe with a gesture not born of the moment. It was as if a robe like that had been a part of your recent life, as if you knew——"

"Paul," Futrell interrupted, "I could not tell you in a hundred years all the adventures which have come my way since that day when Wilks Hurd destroyed my body. I shall not attempt to tell you everything, but there is something you must know. I need your help, must have it."

"I am ready to do anything you wish," Britten declared.

"I was sure of that, my friend," said

Futrell. "You know that Wilks Hurd released my intelligence with the machine I made when I was a very young man, thirty Earth-years ago. What you do not know——"

Britten interrupted quickly: "Earth-years ago! What do you mean?"

Futrell smiled with the manner of a man speaking with a child. "It will be difficult for you to understand," he replied, "that my intelligence transcended both space and time to find a physical habitation upon the planet Phenos. Hurd assisted me in releasing my intelligence. He was in love with the woman I also loved. He killed me, and my intelligence was doomed to eternal wandering in space and time. But Mola, Maid of Phenos, discovered me, transported me to Phenos where I have lived since. I was there given the body of a perfect man, similar to the bodies of Earthmen, since, long ago, Phenosians decided that the bodies of Earthlings were most perfect of all those they might have assumed. Upon Phenos the Earth-forms of birth and being obtain, except there is no death——"

Futrell paused, and into the blue, steady eyes of the body Paul Britten had given him there crept a dark shadow. He continued:

"At least, there has been no death until recently."

"Tell me," Britten declared sympathetically.

"A LONG TIME ago, on Phenos," Futrell said, "criminals' bodies were de-animated, their intelligences banished into infinity. When I arrived on Phenos these disembodied intelligences had made serfs of the Men of Esta, one of Phenos' satellites, and were planning a campaign against Phenos, threatening its destruction.

"These Warriors, as Phenosians called the criminal intelligences they had liberated, had established a 'dark quadrant' in the space between Phenos and

Esta. In this quadrant it was impossible for the Phenosian thought waves to operate; the quadrant was dangerous because a Phenosian intelligence liberated within it for the purpose of scouting the enemy's space ships and wave-projectiles came under the powerful agency of the Warriors' intelligence destroyers.

"I was sent into the quadrant during the battle, contrived to maintain uninterrupted observation service. We destroyed Esta, the satellite; destroyed the released intelligences of the criminals."

He paused; when he continued his voice was muted:

"And now a new menace has appeared. In the old days when Phenosians grew old they had only to enter one of the bodies of the criminals, preserved in suspended animation, or a certain type of de-animation, in the vast animatoriums of the planet. But now those bodies have been used, and, since there are no other criminals being born, Phenosians of the more intelligent, experienced order are in danger of complete extermination by a gradual process.

"Nor is this the worst. Certain Crustacean-type inhabitants of Esta's sister-satellite, Ekta, have recently been waging a campaign against Phenos. They are highly intelligent beings. They have been able to measure the wave used by Phenosians for destroying menacing solar bodies or dangerous interplanetary beings. They accomplished this by picking up the wave on an improved type of oscillograph, by studying its characteristics; and, in the end, they created their own destroyer-wave.

"That wave, turned now in power upon Phenos for more than a century, is gradually withering the bodies of even our younger men. We have been unable to screen against the wave, as we have in certain conditions, against the waves used by the Ektans for observing the movements and the thoughts

of our Men of Science. Unless we do something very soon, Phenos, the paradise of science, will be destroyed."

Britten leaned forward eagerly, his old eyes alight with anticipation. "And what," he said, "do you want of me? What can I do?"

Daniel Futrell stood erect, his eyes filled with burning hope. He spread his arms wide beneath the folds of the robe, cried:

"Your bodies! New bodies for Phenosians! Don't you see, Paul? You must come to Phenos with me and show our young men how to create synthetic bodies. You must save us from death! You must save *me* from death—and Mola, whom I loved and still love, but who must soon die unless she is given that rejuvenation a new body will afford."

Britten lifted his head, his brain charged with tumultuous thoughts, images, plans. What a gigantic possibility—if it could be done! What an adventure to take, now that he had come to believe that his life's work was ended! Vast worlds of scientific endeavor spread before him. Bright Utopias of the real scientist unfolded before his charmed gaze.

II.

FOR A LONG time Britten did not speak, so wrapped in his startling dreams had he become. Phenos! A new planet—evidently ten thousand years in time and billions of miles in space removed from the crusty ball of Earth! A new life filled with daily wonder; the possibility of eternal existence amid the most heart-shakingly beautiful surroundings.

Futrell said: "Mola was beautiful, Paul! Beautiful beyond any Earthly dream mortal man ever dreamed. But now she is old in body, though her spirit and mind are still as fine, as beautiful, as when she came to me through time and space to bring me back to physical

reality from that dark Siberia into which, for eternity, my released intelligence had been banished. I want her body again as it was when my eyes first beheld the splendor of her beauty. You must do this for me, for Phenos, for yourself!"

"But the obstacles before us," Britten cried. "How shall we go to Phenos? How is it possible for you to return?"

A dark cloud brushed Futrell's brow, settled like a depthless pool in his eyes. He lowered his shoulders as if the weight of despair had fallen upon them; his hands clenched, and his voice was brittle with anxiety, with apprehension:

"I do not know; but we must try! I came here because it was the only chance for Phenos to recover its lost estate as the greatest civilization of all the ages. I do not know that I can ever even communicate with Mola, my wife, nor with Noimar, my daughter. I do not know that I shall ever be able to return. But this I do know——"

He lowered his voice, crouched forward. His eyes glittered with purpose, and the indomitable spirit within the body became evident in the tightening muscles beneath the supple skin. His fists clenched desperately, he said:

"There is a chance. The old intelligence liberator I made when I was here on Earth—perhaps we can rebuild it, put into it again the power that first launched me upon my great adventure. We will do it, Paul—you and I. Together we will go to Phenos."

Futrell's determination, his excitement, passed into Britten's brain and nerves. He caught his shaking hands about the shoulders of the younger man, said in a voice that soared with triumph:

"The machine is still there in the cellar laboratory of the old Hurd house. The property is owned by Hurd's heirs. We'll buy it, beg it, steal it. For many years after your body's death, Sunday

magazines published pictures of the machine, called it 'Futrell's folly,' laughed at the madness of a man who had believed himself capable of releasing his intelligence. But you did it! And the machine is still there. We'll have it."

"There may be trouble," Futrell warned. "You are going to have to explain my presence in your house. I must have clothing. We must proceed cautiously, and above all we need the services of a man whom we can trust. Some one, you see, is going to operate the machine that will catapult our intelligences into space and time."

Britten frowned. Yes, there would be many obstacles; but not too many.

"Your presence here will need no explanation," he said. "I live alone except for one servant who is the soul of discretion. I can explain your presence to him without trouble and with safety. It will not be difficult to obtain clothing for you."

He smiled, gazing with fondness upon the man before him.

"You see," Britten declared proudly, "I probably know more about the size of this body of yours than any man ever knew of another! Why, I can tell you the exact millimeter the size of your vermiform appendix! Certainly I should experience no difficulty in obtaining the correct collar size!"

Their joined laughter served admirably as an escape from the tenseness of the moment.

"But money?" Futrell asked.

"I have enough for any emergency," Britten replied.

"And the scientist who can be trusted neither to accuse us of madness, nor report us to the authorities?"

Britten's face lighted. "Dr. Jerome Spaulding! He is the man we want. He owns a small hospital for the treatment of minor mental diseases. His laboratory is sufficiently large for our purpose, and he, too, knows discretion, besides being somewhat of an adven-

turous fellow. He will do what I ask."

Paul Britten was right. Dr. Spaulding, although it required two hour-long conferences with Britten and Futrell to convince him that the whole thing was not a gigantic hoax, turned over his laboratory to them. Britten found it not difficult to buy the machine in the old Hurd house on Long Island. When it was installed in the Spaulding hospital laboratory it was discovered that many of the generator parts needed replacement; that much work remained before it would again function properly.

But such obstacles were easily overcome in the impatient preoccupation of Britten and Futrell. Futrell, equipped with added knowledge obtained by his sojourn on Phenos, worked with skill and speed.

"This smaller instrument upon which I have worked for a week," he told Britten, "may enable us to communicate with Phenos. I must know about Mola—about my body lying back there upon the polished, circular dais of the thought-liberator upon Phenos."

The smaller instrument consisted of a chair equipped with a brass electrode and brass cuffs and anklets, the whole attached to generators which would step up a wave to correspond to the thought waves which were always bombarding Earth. These waves must be caught by an obscure process of synchronization so that Futrell could both send and receive thought messages.

Within ten days the instrument was ready, and Futrell placed himself within the chair, and Britten operated the delicate rheostat.

Success crowned the effort. Futrell remained in the chair for an hour, and when he stepped down, releasing himself from the electrodes, his eyes were heavy with great sorrow, with dread.

"Our people are dying by thousands. I talked with Mola and with Noimar. They beg that we use all possible haste in our experiment."

"We will work night and day," Britten declared. "I shall take drugs if necessary to drive my body on without sleep. What does it matter what happens to this poor, crumbling shell of my body, now that there is the possibility of venturing into your strange land? The possibility of renewing my youth on Phenos?"

And he drove himself forward without compassion through weary nights and days. Each day Futrell communicated with Mola, and the woman renewed her plea that time was precious; that the Ektan waves were becoming more powerful day by day.

Britten and Futrell had entered their names on the register of Dr. Spaulding's hospital. They were, apparently and from the information entered on their case-history card, suffering from morphinism, were undergoing treatment.

THEIR work progressed rapidly, and on an evening in March they were ready for the experiment. Dr. Spaulding, clothed in a lead robe, stood at the controls, testing them. Futrell stood beside him, giving last-minute instructions.

"If we are successful," he told Spaulding, "in liberating our intelligences, it will be necessary for you to make some explanation about our bodies. They must be nourished, of course, carefully tended. I rather think the best plan is for you to diagnose our condition as type of encephalitis. As for myself, I shall not return to Earth; although Paul may desire to do so."

"I do not think so, Dan," said Britten. "There is nothing left for me here."

Futrell smiled, said suddenly: "Paul, get into communication with Mola. Tell her that the experiment is about to begin."

Britten walked toward the chair, adjusted the brass electrodes, raised his head in a gesture of command. Spaulding made the necessary connections on

the panel. Britten had conversed with Mola before, and now he felt the strange sensation of his mind's adjustment to receptivity of waves from Phenos. Presently he was conscious of Mola's thought:

"My unseen friend, I am glad that it is you who communicate with me now. I have news that has prostrated half the populace with grief, has left me in such a state that it little matters whether I live or die. It is this—the body of Futrell is dead."

The intelligence of Mola vanished. Britten's heart was convulsed with sudden panic. He stripped off the electrodes, got to his feet. The others ran toward him, dismay written upon their faces.

"What is it?" Futrell cried.

Britten stared at him. He couldn't tell him what had happened! He'd have to lie. What would the result of the death of that body be? What difference would it make in the final result of their experiment? Would it be possible for Futrell's intelligence to return to Phenos? Certainly Mola could not see any hope of it. Had she not said that the tragedy had prostrated half the populace of Phenos?

"It is only that she urges haste," Britten lied, his soul torn with anguish. "The Ekatans are redoubling their effort to destroy the Phenosians."

The hard synthetic eyes of Daniel Futrell drilled into Britten's. He said: "I suspect you of evasion, my friend; but it cannot matter so much. Unless—Mola! She is not—dead!"

"No, no; she talked with me. She is well."

"Noimar?"

"She gave me no bad news of your daughter."

"Then what was it?"

"Your body—your body there on the plate of the liberator," Britten cried with palsied lips. "It—is—dead!"

Britten stared with troubled eyes at

Futrell's paling face. He cried: "What will this mean? That you cannot return to Phenos?"

"I do not know," Futrell replied, "but the experiment must go on."

Britten followed the younger man toward the large condenser plate of the intelligence-liberator. When Futrell stripped the clothing from his body, Britten followed the movement, and, presently, both men lay nude, side by side, upon the gleaming plate. Spaulding, at the control panel, waited for the signal.

Futrell lifted his hand, and Spaulding thrust the copper knives of a switch into the gleaming clips. A low buzzing sound filled the laboratory. The tone increased as high-frequency waves thronged the field of the transformer, moved up beyond the frequency of light and sound, at last merged into the invisible, audible wave of thought.

Drowsiness crept into Britten's brain. Then came an indefinite period of total unconsciousness from which he emerged into a strangely peaceful existence. He knew that Futrell's intelligence was near, that he had only to utter thought and Futrell would hear.

"We have entered the reservoir of thought," Futrell's mind declared. "Presently your intelligence will enter the body of a young Phenosian who has sacrificed his ego so that you may become a physical being upon the planet."

Before Britten's mind could reply he was conscious of a conflict. He heard the spiritual voice of Mola, the once beautiful maiden whom Futrell had taken as wife:

"Futrell, I prepare to sacrifice my body that you may return to Phenos."

Fear lay heavy upon Britten's ephemeral consciousness as he awaited Futrell's response. There was only silence in the infinite void—and then:

"No; we must wait. I shall not ask another Phenosian to make any such sacrifice," was Futrell's thought. "Let

us wait until Britten has tested his skill at creating new bodies on Phenos."

SILENCE again, infinite and darkly profound. And then a weird sensation possessed Britten. Some metamorphosis not quite clear to his detached intelligence was working a miracle with his sense of being.

He opened his eyes to stare upward at a vast ceiling that glimmered with pale green light. He realized that he was now a corporeal being; that he lay upon a shining dais, quite nude, his brain keen and conscious of physical surroundings. He raised himself to an elbow, stared down at the rounded, muscular arms, the finely tendoned hands. His legs were massive columns of rippling flesh, steel muscles cased in smooth white skin.

This was his body—a new body, and a young body.

"But it is only a borrowed body. There is work for me."

A tall, aged man, wearing a yellow silk robe approached him, extended a hand: "I am Gurgan, chief of the Men of Science."

"I—am—Britten, Earthman," Britten replied.

He came to his feet easily, conscious of great power in his lithe muscles.

Other men approached him, bearing a robe, sandals, an oddly shaped cap which they pressed upon him. Britten, with a dexterity he realized must be that of the brave young Phenosian who had lent, perhaps given, his body for this experiment, drew the robe about his shoulders, slipped his naked feet into the jeweled sandals.

There were many men in the room, all of them tall, straight—except for the first who had spoken, Gurgan, chief of the Men of Science.

And there were two women. They stood a little apart from the men. One of them was old. Her garments lay like a gray shroud upon her, depended with

a note of funereal despair from her thin shoulders. Her hair was thin, and her face was haggard and old, its skin wrinkled and dark.

The other woman was young, a girl in the first tender beauty of full adolescence. Her face was like the petals of peach blossoms, and her throat was a gracefully poised column upon full, smooth shoulders. She wore a crimson garment that was only a shimmering strip of silk, attached by silver straps from her shoulders so that the perfect curves of her body were visible. Her eyes were dark and her hair was a mass of auburn tresses.

Her steady gaze did not retreat before Britten's spellbound preoccupation with her beauty. Instead, her eyes smiled at him with such charm, and yet without hint of boldness, that Britten found it necessary to avert his gaze.

The old woman crept forward haltingly, stopped before Britten, looked up at him with rheumy, red-rimmed eyes. Her voice trembled with passion:

"Phenos welcomes you as her savior! Mola welcomes you as friend of Futrell! We who are old may die, but you must save Phenos from this horrible invasion."

The young woman—and Britten knew she was Noimar, daughter of Futrell—came forward, placed her arms about the body of Mola and led her away.

The aged Gurgan addressed Britten: "Come with me and see what has happened to Phenos. I, Gurgan, am one of the last of the old men of Phenos. Soon, unless you can help us, there will be none left. Soon, unless you can teach us what you have learned about the synthetization of bodies, this scourge from Ekta will destroy us and destroy all this beautiful civilization we have erected upon this planet."

Britten was led from the circular chamber and out upon a plaza, supported high above a white-stone city. As far as his eyes could see, there were

tall buildings of white upon which greenish light sifted.

"Once our atmosphere was blue, but since the bombardment by the Ektans it has changed to the greenish tint you perceive. We have been unable to analyze the source of the light or its content. But it is inimical to life here. Of that we are sure. There was, once, as Futrell probably told you, no such thing as death upon Phenos. Once we who were about to die simply entered the bodies in our animatoriums—the bodies of the criminals. But that source is no longer available, and the Ektan wave is cutting down the length of life of our people."

Britten was aware that Gurgan, as had Mola, had circumvented the necessity of using sound in speaking. It was, Britten realized, just as Futrell had told him—communication on Phenos was carried on entirely by thought transference, and the system was so perfect that it gave the exact impression of spoken language, even to the quality and tone of individual voices.

"We have so little time left," Gurgan continued. "We believe that we can find means of speeding up epithelial proliferation in the creating of new bodies. We may even be able to instruct you in certain experiments necessary in the process of synthetization of human bodies, but your secret of the creation of the base protoplasm, and of arrangement of cells, has not yet been discovered on Phenos. Everything is ready for you to begin your instructions. Laboratories have been created, have been shielded against the action of the Ektans' thought-reading machines, so that they will not be able to know what we are doing."

Britten replied: "The first body created shall belong to Futrell."

GURGAN led Britten down a long corridor and into a vaulted chamber of black stone. Green light poured down

eerily upon a stepped, square dais upon which rested the body of a man, clothed in a black silk robe.

A woman in gray knelt with bared head and cupped hands near the bier.

"Mola mourns for her dead," said Gurgan.

"He was a brave man," Britten declared.

"A brave man?" Gurgan returned. "More than that! That emaciated body which lies cold in death beneath the black tissue of the burial robe once held the bravest spirit Phenos ever knew. Courage, intelligence, faith—these things in their highest development once dwelt in the husk which lies there now. And that courage, that intelligence, that faith, are not dead. They live in the released ego of Daniel Futrell who once saved Phenos from the Warriors of eternity. It shall be as you say—the first created body shall be prepared as the chalice of Daniel Futrell's spirit."

They walked to the bier, lifted the bowed shoulders of the old woman. They told her of what they had just spoken, and they went away from her glad of the light of hope that burned in her eyes.

As Britten left the chamber he became conscious of the bombardment of some intelligence upon the retina of his brain. He paused, said:

"Futrell is trying to speak to me!"

He stood silent, his head lifted, his brows furrowed. Presently he was aware that Daniel Futrell's intelligence was speaking:

"Time upon Earth, Paul, speeds fast! Spaulding has made a gross mistake in adjusting the thought-machine. I cannot get in touch with him. He is working now upon the instruments, but I am afraid he will never be able to adjust them. You know what this means, do you not?"

"Yes," Britten's mind declared; "it means that we cannot communicate with

him; that he cannot communicate with me until he makes corrections of his mistake. You must endeavor to prevent his endangering the intelligence-liberator, for if he wrecks it the last chance of our going to Earth to re-inhabit our bodies there will be destroyed."

The intelligence of Futrell then merged into the dark void beyond Britten's comprehension. But the message the Earthman had received impressed more than ever upon his mind the necessity for speed in beginning the work of preparing the new bodies for the Phenosians and for Futrell.

Gurgan sent out a call through the Kingdom of Phenos, and thousands of young scientists gathered together in the great auditorium at Garlith to hear the preliminary instructions from the Earth scientist who had succeeded in creating a synthetic being. Their eager faces and minds created a profound impression upon Britten. He talked to them as one inspired, sent them away to begin the gigantic work of providing Phenosians with new bodies.

Disturbing news came from Ekta on the screens of the photoscopes operated by young Phenosian scientists. Genetics had recently received a startling impetus, and Ektans were being born at an alarming rate. The secret of Ektan birth had never been solved on Phenos. The massive underground chambers of Ekta were screened against the thought-transference machines and the photoscopes on Phenos. No Phenosian scientist, though many had spent lifetimes on the subject, had ever been able to discern the mechanics of Ektan life progression or the scheme by which the grotesque creatures remained in existence.

III.

BRITTEN, returning late one evening from work in his laboratory, walked quietly along the plaza beneath trees of a strange, unearthly beauty.

Night on Phenos was only a purple twilight, the heavens dark except for the purple glow of Ekta, home of the enemy Ektans who sought to destroy their mother planet.

Britten's shadow, shimmeringly purple, moved beside him along the stone-flagged terrace. A dim white figure moved beside a conical shaft of stone, stepped forth gracefully before Britten. It was Noimar, her beauty laved with the odd orchidaceous light of a Phenosian evening. Upon her face was sadness, anxiety. She lifted her hands in greeting.

"He does not respond," she said, her voice husky.

"Your father?" he asked.

She nodded.

A chill of apprehension spread along the nerves of Britten's body.

"He will be all right," he told the girl, his heart pounding at her nearness, her ineffable beauty.

They walked together along the terrace, silent, brooding.

"Come with me," she said presently, "to the laboratory. I want you to see what the Ektans look like. You haven't seen them?"

Britten followed her, was conducted to a cryptlike laboratory where hundreds of young men were at work at strange instruments.

"Here," said Noimar, directing Britten toward a massive machine of tubes, screens, and oscillographs, "is the machine which marks Phenos' furthest strides toward piercing the secret of Ektan genetics. On this type of 'scope alone are we able to ascertain the exit and entrance of the Ektan genetoriums, vast underground caves in which, by some process we cannot detect, the Ektan monsters renew their lives. We have been unable to find out what system of reproduction the monsters employ."

Noimar spoke to the young scientist at the machine. He stepped aside, and

Britten and the girl took his place at the controls. Britten found himself facing a gigantic quartz screen upon which shadows moved. Noimar worked for several minutes with delicate dials, and at last the scene resolved into sharp focus.

Britten had the curious sensation of looking down upon a vast landscape where all forms were harshly geometrical, though curveless. Mountains were represented by massed solids in pyramidal and cubical form. There was no vegetation of any kind within the area portrayed by the screen.

"It may seem strange to you," said the girl, "that, although the satellite, Ekta, is a spheroid, and its inhabitants are disk-shaped and have something of the characteristics of your Earth Crustaceans, nothing else upon the satellite possesses the beauty of the curving line. Watch closely now at the point where the base of the larger black mountain joins the canyon of the blue light. Just there!"

A thin silver pointer in Noimar's hands wavered close to the surface of the quartz screen.

Britten's eyes drilled with fascination upon the tiny dark disk revealed there. Noimar's expert hands operated the dials. The field of the 'scope threw the outer edges of the screen's surface into gradual, encroaching distortion, while the black disk grew larger, moved out toward the margin of the screen.

Britten's heart expanded with sudden astonishment.

The black disk was alive, was moving. It vanished into the square maw of the mountain, and another monster appeared at the opening of the blue canyon, hesitated for a moment, and then vanished in the wake of the first.

"These horrible creatures," said Noimar, "are the Ektans. They have built up a vast civilization on the satellite. They are intelligent creatures. They have created a shielding screen about

Ekta which prevents our using any of the powerful, destructive rays yet invented on Phenos. When we strike in that great conflict, which is not far distant, we must attack them upon their own soil. Our space ships must transport our warriors to Ekta."

Unconsciously Britten's hand had closed upon the girl's arm. He stared with mad unbelief at the grotesque figure of an Ektan.

"In Earth terms," said the girl, "these creatures are about forty feet high. The black disks are about two hundred and fifty feet in circumference. The tentacles which they use in a strange fashion for propulsion through space, or upon the ground, are some twenty feet long and equipped with suction cups for use in clinging to the ground."

The massive figure on the screen was of Stygian blackness. The greater part of the horrible body was shaped like a discus, seemed to have about it a hint of anthracite hardness and invulnerability. Beneath the body was seven thick tentacles, quite like the proboscides of enormous mammoths of Earth's prehistoric days. Exactly in the center of the discuslike bodies, at the top, were soft-looking, globular masses, slightly phosphorescent in character. These jelly-like nodules pulsed slowly in and out, as if some breathing mechanism motivated them.

Britten asked about the globules, and Noimar said:

"Our scientists have ascertained that the Ektans do not breathe. We suppose that the globules contain the organ of intelligence, but of that we are not sure. We have never destroyed one of them, although we have tried for thousands of years. Despite our best efforts, these horrible creatures continue to multiply at an alarming rate, while our people are slowly perishing.

"Three tasks confront us. We must learn how to destroy the Ektans; we

must learn how to build new synthetic bodies for aging Phenosians; and we must learn the secret of Ektan genetics—for until we know how they reproduce themselves we cannot hope to destroy them.

"These creatures which now pass along the canyon of the blue light and into the cavern are old Ektans entering the genetorium. Now I shall show you what happens at the exit of that shielded, thought-proof cavern."

Britten saw the girl's fingers move skillfully at a dial. The quartz screen became a mass of shifting, distorted light and shadow. When it once more moved into focus, Britten saw a second square opening in the black mass of the mountain. Once more the girl's fingers moved upon a dial, and the screen's power was multiplied a thousandfold.

And now Britten saw more of the creatures.

THEY were moving from the opening at twice the rate of those who had entered on the other side. The creatures spun out across the landscape with vigorous and strange motions of the long, snoutlike tentacles. For a moment their method of hurling themselves into the air puzzled Britten. Then, after a few moments of intense study, he saw that the creatures were using the tentacles, the lower points of which were equipped with vacuum cups, as a sort of centrifugal-type sling.

The tentacles, sucked hard against the ground, began a twisting motion, until the discuslike bodies were half again as high as the normal stature of the creatures. Then would come the sudden, unwinding motion that slung the bodies into the air to whirl like saucers into space.

"They come from the genetorium at about twice the speed with which they enter!" cried Britten, his brain recalling one of the simplest methods of biological reproduction. "That means that the old

bodies are splitting. Have your scientists thought of that?"

"You mean—like an amoeba?" the girl cried.

She suddenly shut off the 'scope, turned and shouted. She was almost immediately surrounded by earnest young scientists to whom she told what Britten had said. Upon the faces of these young men there crept an expression of wonder, then of triumph.

"It may be true," they said. "It has been so long since any of us have thought of so simple a form of life."

The young men returned to their posts, each of them, at once, getting into communication with other departments of the vast scheme of preparation for the coming war with the Ektans.

"I think you have fastened upon an idea which may be valuable," Noimar said, her eyes shining with excitement.

"If the idea is worth anything," Britten returned, "it was just too simple for your scientists to have thought of it."

"Modesty is very becoming in one," said Noimar, "who, within the short space of an Earth lifetime, succeeded in accomplishing what all our scientists and metaphysicians have never accomplished."

EARLY the next morning Britten learned that Futrell had communicated with Mola. The old woman was holding an audience in a little room adjoining the crypt where Futrell's body lay. Gurgan was there, as were Noimar and several of the younger scientists, when Britten appeared.

"His communication was brief," said Mola, her eyes sodden with unhappiness. "He is making repeated attempts to penetrate the intelligences of those Ektans who guard the vast genetoriums upon the satellite. He has not been successful as yet.

"He reports also that a tragedy has occurred upon Earth. Dr. Spaulding

has gone mad—has wrecked the thought-liberator. The bodies of Dr. Paul Britten and the one created by Dr. Britten are being held at the sanitarium and treated for encephalitis. This means that Dr. Britten can never return to Earth; that my husband can never enter that new body he enjoyed for a short space upon Earth."

Britten's mind was charged with gusty darkness. Never to be able to return to Earth! Never to be able to reënter that old and worn body which he had driven with a sort of maniacal fury toward the completion of his lifelong dream!

And Futrell! He caught Mola's eye, asked her:

"Is it not dangerous for Futrell to make the attempt to enter the intelligences of the Ektans?"

"It is very dangerous," the woman replied, "but he was never one to shrink from danger."

"But we are almost ready for his return to Phenos in a new body!" Britten cried.

"If he can help his people by sacrificing himself on Ekta," Mola returned sadly, "he is willing to forgo future physical life."

Britten was silent, awed, before the majesty of Mola's sense of heroism, of patriotism, and before Futrell's splendid courage.

Before the latter days of the Season of the Melting Stars, the vast laboratories which had been given over to the manufacture of synthetic bodies were taut with expectancy. The first of the new bodies was ready for the test. Futrell, on Ekta, was in hourly communication with Gurgan's signal tower. He had declared himself ready for the experiment which would, if its result happened to be successful, give him a new body on Phenos.

A solemn conclave surrounded the dais upon which the first specimen of the new bodies lay. It had been created

as an exact copy of the young body Futrell had once possessed. Mighty generators filled the hall with humming sound. Mola, Noimar, Britten, and the elderly Gurgan, his feeble limbs now almost powerful to obey the strong direction of his still youthful brain, sat close to the raised dais above which the primary plate of the huge condenser was suspended.

The field transcended the world of sound, of color, pitched forward into the realm of soundless, colorless thought waves.

And the intelligence of Daniel Futrell returned to Phenos.

Daniel Futrell, clothed in a new body, rose from the dais, walked across the short intervening space, and swept Mola into his arms. He released her, embraced Noimar, and then clasped hands with Britten.

"There is not time for greetings," Futrell declared. "I want an audience at once with the chiefs of the biological sections, of the engineers in charge of plans for our warships, of the research chiefs who have been working on the problem of the globular excrescences which, all along, we have believed are the center of intelligence in the bodies of the Ektan monsters."

THE MEETING was called. With the aid of diagrams, Futrell explained what he had learned on Ekta.

"It is well-known among Phenosians," he declared, "that I have the unique power of projecting my intelligence for short spaces of time into certain areas which are dangerous to all Phenosians. This was demonstrated during the recent conflict with the Warriors of Eternity when I was able to enter the dark quadrant—an area charged with intelligence-destroying waves—and send back observations of the development of the Ektan forces. My secret is this: I, being an Earthman—or at least still bearing vestiges of an Earth-type

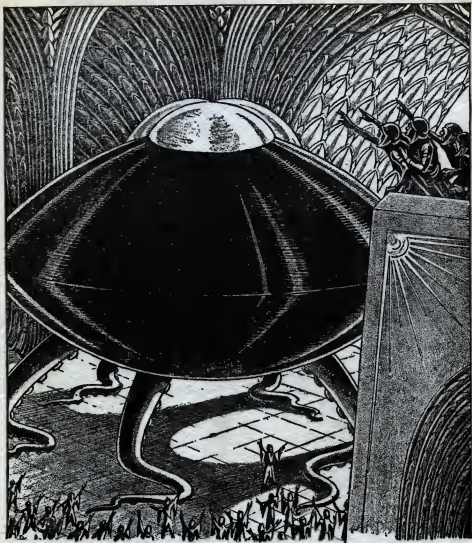
brain—am able to ward off attacks of the Ektan thought-destroyer-waves by willing myself to think of something upon Earth. The Ektans, unable to visualize Earth, unable to understand the human emotions with which I fill my brain, are therefore not capable of destroying my intelligence with their projectors.

"I have made this explanation because my friend, Paul Britten, has probably not understood why I alone am able to approach the outskirts of the minds of Ektan monsters. I use the metaphor because it is, indeed, only the bare fringe of the Ektan intelligence I have entered.

"But I have learned facts which will be useful. Among them: The phosphorescent globules are, in reality, the centers of Ektan intelligence. I have been unable, have failed—just as our scientists with their instruments have failed—to pierce the secret of the chemical composition of those nodular masses which pulse slowly on top of the disk-like shells of the mammoth bodies of Ekta. But I have learned this: The mass is acid in character. Therefore our engineers in the warfare service have only to create a weapon which will fire an explosive projectile containing an alkaline solution in order to destroy these centers.

"As all of us know, the coming battle with Ekta must be fought on the satellite. We know also that it will not be practicable to use destroyer-waves. The Ektans have found the perfect shield against that kind of weapon. We must send our warriors to Ekta in space ships. Our warriors must be armed with the new alkali guns. All these preparations must be carried on in absolute secrecy and in the laboratories which are shielded against the Ektan thought-machines, so that they will not have time to build effective shields against our new guns."

When the meeting was over, a thousand young scientists hurried back to



*"We must send a spy to Ekta. And this is how
our spy shall go!"*

their laboratories equipped with formulas and specifications with which to manufacture the new weapons. Other young men were set to work at speeding up the manufacture of new bodies for the fast-aging Phenosians.

There came the day when Mola, the aged crone, withered and palsied, shed that old body and entered a new one. The ancient, doddering Gurgan, wisest

of all Phenosians, lay quietly beside the newly created body of his youth, slept for a little while, waked to find that his wisdom, his youth of mind, and all his time-encompassed ego had entered that new, virile, and splendid body. Britten, too, exchanged his borrowed body for one of the new.

"This is indeed a great day for Phenos," Gurgan declared to his peo-

ple. "Soon our laboratories will be able to overcome the encroaching terror of the destruction of our old. Day by day the power of the Ektan body-destroying waves grows stronger; day by day we see younger men dying; but the day is coming soon when our solution of the problem will be adequate, and death, once more, shall be unknown."

The ordnance laboratories and factories went into mass production on the new alkali guns. The synthetic bodies were being created now in quantities which almost equalled the destruction of the inhabitants of Phenos. The citizens of Phenos rejoiced, eagerly awaited the day when the giant flotillas of Phenosian space ships would hurl themselves with the speed of light across the dark, cold void between Phenos and Ekta.

Night and day, in regular shifts, young men eagerly pored over the oscillograph charts which recorded events on Ekta. The population of the satellite was increasing daily. The Ektans were aware that, in some undetected manner, the Phenosians had circumvented the power of the destroyer-waves. Their own observation stations, massive, geometric citadels high on black mountain peaks, were keenly alert to the signs of renewed activity on Phenos.

Phenosian technicians and mathematicians made careful charts of Gurgan's perusal. Britten found himself caught up into a vast excitement, a sense of power he had never known in his Earthly existence. His occupation as chief of staff of the synthetic-bodies laboratories gave him small opportunity of knowing how other plans were progressing. He saw Futrell only occasionally; Noimar not at all.

And so it happened that the day arrived without warning to him. He was busy supervising a group of young men, whose task it was to grow cultures for the proliferation of hair cells, when a young scientist burst into the room with startling news:

"The ships—a thousand Jal types—have taken off for Ekta!"

The young men about Britten dropped their work, thronged about a gigantic photoscope which was a part of the room's equipment. Britten stopped them, his voice harshly commanding:

"To your work! Your part is here, an important part. Many Phenosians must lose their lives upon Ekta, and it is our work to furnish new bodies."

Britten, himself, continued with his work so that it was not until twilight that he knew of what was happening on the satellite. He went with Futrell, Mola, and Noimar to the base floor of Gurgan's tower where a gigantic photoscope portrayed the battle.

He stood beside Noimar, and her hand closed hard upon his arm.

"We are losing," the girl said weakly.

Fear drove like a sword into Britten's heart. Every nerve in his body became taut with pseudohysteria as he watched the terrible conflict.

UPON a dark plain of Ekta, centered in the quartz screen of the photoscope, lay hundreds of sleek, projectilelike space ships. From these ships swarmed the Phenosian warriors, armed with the short alkali guns. The Ektan monsters set the air above and about the ships aswarm with their whirling bodies. The gunners, expert from their months of practice with the new weapons, were accurate and deadly.

Their invisible projectiles sped from the stubby barrels of the guns. The phosphorescent globules atop the Ektan bodies made plainly visible targets, and the guns were effectively doing the work for which they had been manufactured. The plain was thick with dead Ektans, the globules shattered, smoking with the chemical reaction. But other monsters, their tentaclelike legs twisting against the ground, whirling their saucerlike bodies with terrible speed, came down the slope, soared toward the army

of the Phenosians, crashed with imponderable force against the sides of the ships.

Britten turned and stared at the face of Futrell. The man's eyes were slitted, his face white with anxiety.

Britten spoke in a whisper: "We are losing."

Futrell nodded, his eyes hard on the screen.

The attack of the Ektans was more furious now. The massive bodies soared down the incline of the plain, crashed into the ranks of the Phenosians, destroyed them by the hundreds. The dwindling forces of the army began retreating toward a ship which had not yet been destroyed. This was the signal for an even more concerted and massed attack by the Ektans. Their great bodies spun high into the air, came down with terrific force to smash, knife-like, into the ships.

From the tower above, through the lines of the electrical thought-transference machines, came the unvoiced thought of Gurgan whose mind controlled every movement of the army on Ekta:

"The first skirmish belongs to Ekta. But we will try again. A second flotilla of larger ships is ready to leave our shore of Ekta."

Those in the room heard Gurgan's orders to Fada, commander of the control ship on Ekta:

"Take off immediately and remain at a safe distance until Rho reports to you. Give me all information possible at once."

The photoscope screen clearly revealed that Fada's control ship, containing instruments for communication, was already preparing for departure. Its massive doors swung back, and the warriors entered in orderly retreat. Not so with many of the other smaller ships. The warriors, their brains shaken by the invincible character of the Ektans, were running wildly toward ships

which succumbed to the furious attacks of the monsters.

"It is madness to send other ships to Ekta," Futrell cried.

Britten stepped quickly toward him, caught his arms. "Mutiny!" he warned. "Gurgan is our chief."

Futrell subsided into tight-lipped silence. Britten turned his eyes upon the screen.

The second flotilla, composed of ships three times as large as those of the Jal type, were landing on Ekta. The Ektans were ready, and the fury of the previous battle was as the purring of a tabby cat to the full-throated roar of a lion compared with the gigantic conflict which now ensued.

The monsters propelled their strange bodies high into space. The dislike projectiles curved lazily over at the apex of the flight, then crashed downward with gathering speed. One after the other, lined out like a flight of black plates, they descended upon the space ships. The armored sides of the ships withstood the first, the second, even the third of these descending bodies, but, as a lump of coal will at last crack beneath repeated blows of a sledge hammer, the ships were finally crushed—some even before the warriors could emerge from the doors.

"It is useless!" Futrell cried. "Senseless waste of men and material. Can't Gurgan understand—see what is happening? Can't he understand that we cannot hope to win against such odds?"

The woman Mola stepped beside him, talked to him in a subdued voice. Her manner indicated earnest entreaty.

But Futrell was adamant. He stepped forward beside the operator of the photoscope, grasped him by the shoulder, whirled him out of the seat, got his own hands at the controls of the machine. He turned a dial, his eyes hard upon the screen.

The scene smeared out of focus, then resolved into other scenes which Futrell

flicked out of focus until he found what he wanted. At last the scene for which he had searched crept into clarity upon the screen. It was that of the largest of the genetoriums upon Ekta. Out of the blue canyon trooped the file of Ektan bodies to disappear into the dark cave of the mountain. The scene dissolved. Flickering shadows, screwed tightly into focus, now revealed the exit of the genetorium.

New Ektan bodies emerged in swift sequence, spun upon strong tentacles, rose into the air like spinning saucers to whirl away into the darkness.

"There are thirty-five of these genetoriums upon Ekta!" cried Futrell. "How can Gurgan expect——"

Mola sprang beside Futrell; and Britten went to her aid.

The woman said tensely: "Gurgan will hear you! Please, for my sake and for Noimar's!"

Futrell wheeled upon her, his eyes dark with frustration. "You cannot doubt my love for you," he said. "But you could not love me had I not the courage to speak here. Gurgan? I want Gurgan to hear me. He must hear me. He is destroying the lives of our people in a senseless engagement. We cannot win. We haven't a chance to win. Gurgan! You must hear me!"

Futrell stood back. He awaited, as all the group did, the reply from Gurgan's tower. Presently it came, the thought heavy with the intonations of Gurgan's wrath:

"Speak! But remember that I can forgive mutinous conduct in a man who has proved his courage and his patriotism only if mutiny is founded upon truth. If what you have to say to me has warranted my diverting attention from the conflict at hand, then, and only then, shall you live."

Mola gasped, clung to Futrell's shoulders with dismay.

Futrell's voice was clear, bell-like: "I have this to say: It is impossible for

us to destroy the Ektans so long as they emerge from the genetoriums faster than our guns can kill them."

IV.

THERE was a deathlike silence in the room. Britten gasped, his mind recoiling from the implications that lay upon Futrell's statement. It was true. Gurgan could not fail to see the logic. The campaign against Ekta would fail unless some way could be found to prevent the rebirth of new bodies of the monsters.

The silence obtained for several minutes. Every person in the room realized the truth, the despair, the tragedy, of Futrell's announcement. All the vast preparations of the Phenosians had availed nothing. Phenos was doomed unless this suddenly visible menace could be circumvented. The Ektan waves would become more powerful; even the bodies of the young men would wither and perish, until at last no life could exist upon the planet.

"He does not speak," cried Mola, "yet he must understand!"

In that dramatic moment, when all Phenos waited for Gurgan's reply, Paul Britten stepped beside Noimar, passed his arm about her shoulders. She crept against him, her body trembling with fear.

The voice of Gurgan: "To Fada, on Ekta: Return at once to Phenos with such parts of your forces as you can muster."

A cry of happiness amid the electric air of tragedy burst from Mola's lips. Noimar wept upon Britten's shoulder.

Gurgan had agreed with the announcement Futrell had made, realized that Phenos was facing the most horrible catastrophe of its existence. Futrell was safe from a charge of mutiny against the chief of the scientists.

Futrell cried: "It would be well to

order Fada to bring back, if possible, the body of one of the slain Ektans."

Silence from the tower of Gurgan. Then:

"To Fada: Recover, if possible, the body of an Ektan and bring it to Phenos."

Britten frowned, addressed his friend: "Why? Why do you want the body of an Ektan?"

Futrell smiled, his lips thin and white. "Because, my friend, you are going to build one like it."

Beyond that cryptic statement Futrell would say nothing of his intentions. Fada, on Ekta, overcame the difficulties entailed in bringing back one of the monsters. Within the space of an Earth-time hour he arrived on Phenos, was directed to land on a field shielded against the photoscopes of Ekta. The gigantic body of the Ektan was removed from the space ship and transported by the use of powerful gravitation-nullifiers to a secret laboratory where research biochemists, surgeons, and Britten's best young scientists set to work on it.

It was soon discovered that it would be impossible to bring life back into the great, black body. A new body, a new center of intelligence, must be made.

Britten made an effort to ascertain from Futrell the reason for attempting to create a synthetic Ektan; but Futrell, busy with preparations for a second attack upon Ekta, dodged the issue, made evasive replies.

Gurgan fired his young assistants with renewed zeal for their work. The body of the Ektan was torn down cell by cell in order to obtain data for the construction of another like it. Britten studied the hanging shreds of the smashed phosphorescent nodule, made elaborate tests which at last convinced him that Phenos could furnish media in which a new nodule could be made.

In the meantime, a large space ship, faster than any heretofore built, lay in

its cradle in the vast underground shops at Garlith. All these preparations were guardedly screened against the photoscopes and the thought-machines of the Ektans.

And as the days passed the vibrations of the body-destroying bombardment from Ekta became more intense. Phenosian men and women were aging far more rapidly than was normal. Scientists of not more than thirty years, as computed in Earth-time, were finding it necessary to guard their health with scrupulous care, to limit their hours of labor. And the green twilight of the Phenosian day became yet more grisly, more menacing to the spirits of the Phenosian people. Young warriors, thinking of the day when they must risk their lives on Ekta, died by their own hands, and fear such as Phenos had never experienced laid a grimy hand upon the hearts of the people.

Two days before Ekta's perihelion, in the time of the Jurna, Britten announced to Gurgan that the Ektan monster was ready for his inspection. The skill of the young scientists, guided by the brain of the erstwhile Earthman, had resulted in the creation of a perfect Ektan monster.

It was transported to the hall of the Men of Science, and Gurgan, Britten, Futrell, and the two women, the wife and daughter of Futrell, came to view the monstrous being.

They gazed upon the massive creature, towering more than seven times their height above them. They watched the slimy tentacles move languidly back and forth, heard the sucking sound of the vacuum cups upon the marble floor. Against the ceiling of the room there glowed jaundiced light from the gleaming nodule centered on the upper surface of the anthracitic disk that was the larger part of the monster's body.

The party mounted a stair to a gallery, the better to observe the hideous thing. There they looked down at the

glistening plates of the black body, the hard outer rim of shining, metallike substance, the pulsing nodule into which centered whatever system of nerves or motor control Britten had fashioned in the monster's body.

"If that creature knew its existence," said Futrell—"if it knew its power——"

"But it doesn't know," said Britten. "And I hope it will never know."

Futrell went on, ignoring the interruption: "—it would wind that black disk tightly upon the twisting tentacles, release the power, send its hulk of a body spinning through the columns of this hall in the fashion of a top spinning through a falling house of cards. He could bring this building down upon our heads—if he only knew—if he could only——"

"But it is brainless, lethargic," said Britten, "like the man I made on Earth."

Futrell smiled bitterly. "And what happened to your man—there in the moment when you had given up hope?"

"Your intelligence entered it," Britten replied, puzzled.

"Of course!" Futrell declared. "And the time has come when Phenos must send a spy to Ekta—a spy who can tell us what happens in the genetoriums."

Britten frowned, continued to stare with bewilderment upon Futrell's face. "What do you mean, Dan?" Britten cried.

"Only this, my friend," Futrell replied easily, calmly, "I propose to send my intelligence into the brain of this creature and have them set me down upon Ekta in order that I may enter the Ektan genetoriums and discover, if possible, the secret of Ektan genetics."

OF THOSE with Futrell, Britten was the only one who betrayed shock. He glanced at Mola, cried out:

"You must not permit him to do this mad thing. You must tell him he cannot risk his life in any such manner."

The face of the new and beautiful

Mola turned sadly upon Britten. In her tones, when she spoke, there was maternal resignation. "I know how useless would be any request that he should not go upon this mad mission," she declared.

"Of course, I shan't leave to-night," Futrell said. "I do not yet know that I can transfer my intelligence into that pulsing, yellow globule. I do not know that a Phenosian intellect, or ego, or mind, can adjust itself to the motor and sensory nerves of the Ektan body."

With terrible misgivings Britten, Mola, and Noimar watched the experiments of the following days. These misgivings changed to a profound and horrible sense of impending tragedy on the day when it was discovered that Futrell's intelligence, or that of any other Phenosian, could and would enter into the body of the synthetic Ektan.

Their hearts clutched in the fingers of unutterable dread, the three watched the monstrous Ektan cup its slimy tentacles against the earth of a space-ship field, saw those tentacles twist into a coiled spring, saw the released centrifugal force hurl the body high into the air. That monstrous thing was Daniel Futrell; it was Daniel Futrell's intelligence which motivated its absurdly horrible means of locomotion.

Mola and Noimar turned away, did not look again at the massive, spinning disk that charged through the greenish twilight of the Phenosian afternoon. Later, when Futrell had assumed again the body that lay in suspended animation upon the dais of the intelligence-liberator, Mola and Noimar had retired. Futrell asked Britten about them.

"Do you imagine that your loved ones can bear for long the horror of seeing you merged with the body of that terrible thing?" Britten asked angrily.

Futrell's face clouded with doubt, with anxiety. But he shook his head solemnly. "There is no other way," he replied huskily. "I dislike submitting

them to such exquisite displeasure—but I shall leave within the hour for Ekta. There is no other way."

Britten turned on his heels and left his friend. Fifteen minutes later the old-young scientist, long ago having almost forgotten that he was ever Dr. Paul Britten, met Noimar in an alcove overlooking the city of Garlith.

"I had to see you for a moment," he said, "to tell you that no matter what comes to me—to-morrow, or in a thousand years—I shall love you, and that you are to know that I loved you when I first gazed upon your beauty."

The girl went into his arms, her eyes warm with the flush of love. "I have waited for you to speak," she declared.

Britten stepped away, his heart pounding in his breast. He took her hands in his, looked into her eyes. "I shall remember this moment always," he said.

He lifted her hands to his lips, released them, swept doggedly out of the inclosure.

THERE was no time in which to make love; it would be ruinous to Britten's plan to remain longer under the spell of this moment. He closed his ears to the entreaty that sprang into sound upon the girl's lips. He must not allow the weakening emotion of love to deter him from his purpose; to tip the scales the wrong way in his decision between life with Noimar and possible death, alone on the purple satellite of Ekta which soon would climb high in the Phenosian heavens.

The Hall of Science bustled with tense, impatient preparations. The giant body of the Ektan, like a grotesque dirigible, lay quiescent just inside the western arch of the hall. Not far away, its powerful engines laggingly alive, was the new space ship, manned by the pick of Fada's officers and crews. It was ready for the entrance of the Ektan, ready for its secret voyage through space

to Ekta where it would disgorge from its vast hold the body of the Ektan spy!

Paul Britten entered an adjacent room. Everything there was in readiness for the fusion of Daniel Futrell's intelligence with the Ektan monster. Futrell stood with folded arms, awaiting the moment.

Britten ran toward him, caught with anxious hands at Futrell's arms.

"Mola!" Britten cried. "She is ill! She asks for you."

Gurgan stepped beside the two men. "There is time for you to go and return," he said.

Futrell cast an anxious glance about the room, turned and went outside.

Britten flung himself upon Gurgan. "I shall take his place. I have made secret tests with the Ektan body, and I know I can do whatever he can. He means too much to the planet of Phenos to risk his ego on this mad adventure. I demand that I be given his place!"

Gurgan shook his head. "It is impossible," he replied curtly. "Futrell would never forgive me. We shall await his return."

Britten's insistence, his determination, were like hard bits of stone in his brain. His nerves, lashed into frenzy, betrayed themselves in his wild eyes, his distorted face.

"Futrell is not coming back!" he cried. "He is—not—coming back, I tell you!"

"What do you mean?" Gurgan asked furiously.

Britten retreated before the hard anger in Gurgan's eyes. "Mola is ill," he lied. "He will not return. He will send word to you——"

"You defame the character of the man," Gurgan said. "Get out of here!"

Britten gained new courage. He locked glances with Gurgan. "I demand that I be allowed to take his place," he said. "I have asked nothing from Phenos for my services until now. But now I demand!"

"My aids do not demand!" Gurgan replied. "You do not realize the danger of this mission. Once upon Ekta, Futrell will be cast upon his resources. He knows nothing of any value about Ektan civilization. He does not know that we can ever bring him back. If the Ektans pierce his disguise they will kill him, destroy body, brain, spirit."

"I know all this," said Britten. "And that is why I must go—not Futrell!"

"It cannot be done; I forbid it," said Gurgan.

Britten lowered his voice to a gusty whisper: "Futrell will not return because I have employed men to see that he doesn't!"

Gurgan roared his astonishment, his denial that men of Phenos would dare carry out such a scheme.

"It is true," Britten urged. "They will not harm him. I lied to men who shall be nameless lest your fury destroy them. But they were told that Futrell was ill, that he needed attention at once, that they must act over his protests. They will obey my orders to the letter. The intelligence-receivers in the chambers of Noimar and Mola have been rendered useless, lest Mola be distressed at the turn of events, and lest Futrell get in touch with her. As soon as I am safely off, both women will be informed, and Futrell will be released."

Britten's passionate plea softened Gurgan's wrath.

"Do you mean that you are willing to take such a risk," Gurgan asked, "in order to take the place of your friend?"

"He is more important to Phenos than I shall ever be," Britten declared. "I had a full, not inglorious, life upon Earth, was an old man. I live now, as Earthlings might say, on borrowed time. It is better that I go in his place."

Gurgan turned in his tracks, held up his hand in a gesture of command, snapped a series of orders, ended with: "Make the necessary adjustments on the

machine to fuse Britten's intelligence into the body of the Ektan!"

Light, sound, and thought impinged upon the globular mass atop the disk of the Gargantuan body of the Ektan into which Britten's intelligence had passed. The lagging, silent motors of the great space ship moved into humming sound as lean-fingered young engineers in the control rooms touched rheostat handles.

Britten maneuvered the horrible body he now possessed with pachydermic motion toward the waiting ship. He passed slowly through the great doors, saw them fold in upon him. There was only darkness in the cavernous hold of the great ship. He was conscious of no movement, but knew that the ship must have taken off with alarming speed, yet with a dexterity that was the flower of Phenosian engineering and piloting skill.

TIME passed leadenly, the vascular pulsations of the great globule strangely affecting the intelligence which inhabited it. It was to Britten as if an overpowering nausea invaded his ego; as if every emotion of delicate beauty his soul had ever nurtured had been now insulted by the disgusting entrance into this weird and terrible behemoth of a body.

Once upon Ekta, he realized, his intelligence would be bombarded with strange, intractable thoughts. He doubted that he would be able to pass among the hordes of Ektans without attracting attention to himself by his inability to conform to Ektan customs, habits, and methods of thought transference.

He realized dismally what failure on his part would mean to Phenosian civilization—realized this the more desperately because he had forced his services upon Gurgan. If he failed now he would forever be outlawed from Phenos; he would lose the eternal friendship of Futrell and the paradise of love and friendship with Noimar.

The mad scheme planned by Futrell

required skill in execution for its consummation. Had he, Paul Britten, the necessary dexterity and courage to carry it out? Were there elements which Futrell had not confided to any one and which were vital to the success of the venture? How should he be able to enter, not only one of the genetoriums on Ekta, but all of them in swift rotation?

The doors opened slowly, noiselessly, and the Ektan monster crept out upon a dark landscape which was pregnant with hidden danger, alive with invisible menace, writhing and horrible.

The doors closed again, and the great gray ship moved out upon its return journey.

He was alone on the satellite, not as a Phenosian, but as a spy, clothed in the grotesque body of a synthetic Ektan. Were he discovered he would meet death—or some fate more horrible than death. The death of an Earthling and the death of a Phenosian were similar—but what man could conjecture what the death of an Ektan was like?

It would be impossible for him to communicate with the Phenosians until the warriors were again set down upon the satellite, or until he signaled the operators of the photoscope on Phenos that his work was done.

He had carefully studied with Futrell the topography of the satellite; he knew how to find his way from one to another of the vast underground genetoriums—set down in accord to geometrical design—where the Ektans split, like giant amoebae, into new twin bodies.

But would he be able to enter a genetorium? Was there some method whereby the guardians of the genetoriums would be able to detect this alien presence?

Here, he knew, he must take his first chance. It was quite possible that Gurgan believed that other Ektan bodies would have to be made, other Phenosian intelligences sent to the satellite before

the secret of the Ektan genetics could be solved. Britten knew that if he could send back only the smallest hint of the manner in which the Ektans had solved the problem of existence he would, in a small measure, gain success.

But his highest, his problematic, success would be attained if he could succeed in destroying the genetoriums. That scheme was part of Futrell's plan, and now responsibility lay heavily upon Britten's ego. He could not fail.

The pulsing darkness about him vibrated with unseen presences, with unspeakable filth and obscenity. It was as if Britten had been set down into some vile and fetid pool, unaware of the true faces of the myriad dangers about him.

His Ektan-encompassed intelligence stirred. With a naturalness born of the synthetic senses of the body in which he lived, the cups of the tentacles sucked at the ground. The circular body twisted downward, the tentacles coiling until the hard, musclelike composition of them was taut.

The next moment the body soared into the air, was presently moving over a landscape lightened by the reflected rays of the sun Vaterne upon Phenos. And upon the distant horizon, silhouetted for all the world like a flight of clay pigeons trailing dependent legs, were other Ektans. Britten motivated his flight downward; his tentacles plucked at the ground for a second; the twisting motion of his discuslike body gained new impetus and he found himself among the others.

All were bound, he knew, for a genetorium, and presently, directly beneath him, Britten saw the blue canyon. The flight of Ektans soared downward; one by one they entered the canyon. They moved forward, haltingly, in a series of spinning motions, through the channel of the canyon.

The black maw of the genetorium opened before Britten. His gigantic

body entered. A strange dark ray darted across a triangular corridor. Here and there, along the slow procession, an Ektan body darted out of the line. These bodies, Britten presently became aware, were serving as guides. He flung himself out of the line just as it entered a vast chamber, shaped like a pyramidal bowl.

The Ektans moved down, circling, along the sloping sides of the pyramidal crater. When a body entered the crater, others followed swiftly.

Britten was aware of no thought waves directed toward the phosphorescent nodule into which his own intelligence had been fused. He realized that these Ektans, hurrying toward rebirth, had in some manner submerged the operations of their brains so that Phenosian thought-observers should fail at detecting the secret of their genetics. Britten knew that this behavior, in itself, had saved him from discovery. He knew that, should one of these creatures challenge him, he would be lost.

UPON the crest of the pyramidal crater, Britten hesitated. Should he follow these creatures into whatever experience they were to undergo? What would happen if his adopted body should come under the influence which was responsible for the splitting of the Ektans? Would his intelligence become dual; would his intellect be deranged?

He knew, however, that the chance must be taken. He could not risk doing less than Futrell had declared he would do.

His tentacles spun languidly, and his great body began whirling in wide, decreasing circles down the sloping crater's sides. Presently he found himself upon a square floor which descended rapidly into a pit. It stopped. Britten flung himself into a second chamber. In a gallery above there were many Ektans. There was a pale phosphorescent light in the chamber.

Just ahead, Britten saw an Ektan body upon a dais.

Suddenly, powerful energy seemed to flow into that body. Stabbing violet rays impinged upon it from massive machines high above the galleries. There was a sudden blinding flash—

The body had split—and two monsters whirled away along a corridor.

Britten felt the crush of a body against him. He sensed the presence of an anxious Ektan whose passion for rebirth urged him forward. Britten moved to one side, his ego hardening with fear.

But his movement created no surprise among the creatures that thronged the gallery.

He was safe—so far. There were many generations on Ekta.

One of the huge tentacles lifted, groped beneath the disk of Britten's assumed body. The cup fastened upon a square, hard block of metal which had been concealed by means of ingenious clips to the under side of the body in which Britten had set out on his dangerous mission. The tentacles noiselessly lowered the square block to the ground, shoved it back against the black wall of the chamber.

Britten moved along the wall. Directly across the dais, upon which the rays were directed, another Ektan moved. Britten knew that, so far, because of the necessity for guides, his presence had been undetected. He moved forward, just as a second monster split into twin parts.

Presently he was outside the genetorium, his spirit exulting that his first bomb had been placed. He remembered that the young scientists were waiting for his report. He whirled his body far into space and, by twisting the trailing tentacles, descried, in the air, a letter of the Phenosian language.

The observers would see and understand.

He visited a second genetorium, and

there was able to place another of his bombs—an invention of the Phenosians and operated by radio control. When all the bombs had been set, Britten could report the fact—and a slight touch from the control tower of Phenos would set them off in a single gigantic blast.

From one to another of the genetoriums Britten moved, until he had planted all but the last of the ingenious and deadly contrivances. In the last chamber of genetics there came a sudden and alarming movement among the Ektans.

It occurred just as Britten had released the last bomb. He was suddenly aware that he had been discovered—that some Ektan intelligence had noted the presence of an alien, a spy.

And in the instant of discovery there also came the instant of recognition.

V.

THREE monsters bore down upon Britten. His tentacles strained against the floor of the chamber. The disk of his body moved with alarming speed toward the exit passage. But it was blocked by massed Ektans.

Britten spun his body once with furious speed. The hurtling rotation of the monstrous body flooded his still Phenosian ego with nausea. He knew that the cutting edge of the disk had sliced deep into the huge bodies in the passage.

He was attacked now from the rear. The Ektans, their bodies spinning with the audible hum of vast saws, crushed against him. He knew then that Ektans could feel pain, for his own intelligence picked up the magnified torture of the nerves into which the Ektans crashed and tore with venomous fury.

The passage widened. Britten's fleeing body crashed heavily against the walls; was battered and torn by the massed attack of the Ektans who were gushing forth in massed formation from

the genetorium. The whirling bodies slashed again and again into his own, until the shell of the monstrous body his ego inhabited was torn into ribbonlike shreds.

The opening of the passage loomed ahead.

Strength to gain it, Britten realized, was fast dwindling beneath the horrible attack of his enemies. But he must gain that exit. He must find somewhere the strength with which to report to Phenos that the last bomb had been placed.

But now the Ektans were redirecting their attack toward a more vulnerable point. Two of them soared high overhead, sliced their bodies downward so that both edges of their discuslike bodies cut deep into the pulsing globule on Britten's body.

Darkness settled upon him, a vast and horrible blackness peopled with distorted events and garbled thoughts. Futrell!

With the last vestige of intelligence left to him he called upon his friend of Earth: "Dan! I die—I die!"

ACROSS time and space, across the cold void between Phenos and the unruly satellite called Ekta, that call winged upon the waves of unmechanized thought—and Futrell heard it. It had happened before to Futrell, long ago when Mola had called to him, had come to him into the vast reservoir of free intelligence and guided him to the paradise of Phenos.

Britten emerged from horror to physical reality. He lay upon the dais in the Hall of Science, in the City called Garlith, of the planet Phenos.

About him were his friends. He got to his feet, his arms extended toward Futrell.

"I am sorry, my friend. You must have been very angry. I have failed in the mission. I did not take your place for the purpose of winning glory. I went because——"

Futrell smiled. "Say no more, my friend," he said. "When you called to me as the body of your Ektan carrier was killed there in the passage, I understood then that you went because you were my friend and because of my family. You shall make no apologies. Your efforts were highly successful. When I received your call I immediately informed the engineers that the bombs were ready. A thrust of a hand—and the vast genetoriums were destroyed. Our warriors have taken possession of the satellite. I doubt now whether there is a monster left who has escaped the pillage of Ekta."

Britten, puzzled, asked: "But how did it happen that my intelligence returned to Phenos?"

"Our warriors had orders to search out the body you inhabited, and to bring it here. They did so, and your intelligence, not yet annihilated, was resuscitated by means of artificial waves. Once more the science of Phenos has triumphed, and you have made a place for yourself for eternity in the hearts of Phenosians."

Britten smiled, his face alight with a great happiness. He clasped hands with his friend, and they stared into each other's eyes for a long time.

"Science!" Britten declared. "It has accomplished many wonders, but it was the call of human soul to soul that gave you my message when that monstrous body of mine was slain there in the passage."

Futrell nodded soberly. "Yes," he said. "Only you and I, of all the Phenosians, have this power. And upon Earth, in the Spaulding sanitarium, there yet remains a perfect human body. Some day, when we learn how to communicate with Earth with greater ease, you and I must return there and enter into that body. But just now——"

Futrell turned, swept his arm toward an alcove, bathed now in the clean, blue light of the Phenosian heavens.

Noimar was there.

"I think she is waiting for you," Futrell said.

Britten, his breast surging with emotion, turned and walked toward the woman he loved.

Once in a great while there comes out of the blue a story so outstanding that a new name is added to the Honor Roll of science-fiction authors. So, all unheralded, came the first stories of Edward E. Smith, Ph. D., and J. W. Campbell, Jr., and a dozen others—Leinster, Wandrei, Kelly, Stuart, Schachner—the list has grown indeed since ASTOUNDING reentered the field. And in a short time there will appear on the Roll another new name when in the pages of "our" magazine THE EINSTEIN EXPRESS begins its titanic and pioneering journey. For here indeed is a story that will be remembered when the great majority of its contemporaries are long forgotten.

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Illustrated by Elliot Dold

The Great Cold

*He plunged
down, slicing
and jabbing
with his heels.*

There will always be heroes!

by Frank Belknap Long, Jr.

THE LITTLE web-footed man swam slowly through the dark sea. With chest forward and lungs distended he breasted the wide current, gliding evenly between irides-

cent jellies and parrot-beaked fish. As he swam, enormous eyes stared at him, and dangling tentacles caressed his limbs.

He swam without fear, for he was

in a charted area of harmless food-giving plants and animals, and his mission was a pleasant one. Altering his course he descended in a straight line toward a cluster of spongy shellfish. As he floated gracefully above it he turned swiftly on his back, and thrust downward with his legs. The sharp cutter attached to his heel went deeply into the soft mass. Again and again he thrust.

The dislodged mass ascended, and he seized it in his teeth. Turning about in the water he swam slowly to the surface. The water was black with human heads as he broke the golden surface film. All about him others of his kind moved swiftly shoreward, with clusters of soft foodstuffs dangling from their thin lips.

Far ahead black rocks towered. Centuries of erosion had worn and compressed them, and the great sun now bathed them in an amber radiance as it declined slowly in a circle of fire. At the base of the mile-high cliffs the summits of the Barnacle Masters glistened with a luster as of wind-glazed sandstone.

The summits protruded slightly above the water, and luminous shadows moved behind their yawning valves. To the web-footed man these shadows were more omniscient than the mysterious forces which had created him, for the swollen bodies of the majestic lords of the sea, and the enormous complex minds in their capitulum, had set stern limits to his willing, and relentlessly conditioned his behavior.

Beside him in the warm sea another man was swimming. His body was feeble, his mind fearless. In his persistent human way he strove to pierce the heavy dark veil which concealed the future. As he swam cliffward he spoke in a sibilant whisper:

"Clulan, they intend to shrink us. They have decided that we are less alert than our mates; that our fingers are

clunisy, our bodies uncouth. They admire the slim graceful bodies and agile minds of our mates. To diminish our ugliness they will shrivel our bodies and minds, as the forces of nature have shriveled the males of their own kind."

Clulan shuddered, and a feeling of dread pervaded his little being. He turned slowly upon his back, said:

"Ten million years ago, Sla, when the glory of terrestrial dominance enveloped our little race, the Tall Ones had minute, complementary mates. It was always so, and they have grown indifferent to the shame and humiliation. But if they shrink us, our mates will despise us."

"That is true, Clulan," agreed Sla, in a grim tone.

Sla, being weak of body, was seldom sent forth on food-gathering missions. As a wise and able servitor of the Barnacle Masters in the chemical caverns he was privileged to glimpse the future dimly, to behold vaguely prefigured the vast, stupendous dreams of perfection which were continually taking shape in the minds of the crustacean overlords.

He knew that the Barnacle Masters dreamed hideously of world dominion in their white shell towers. For millions of years they had contended with the great land invertebrates for terrestrial supremacy, working secretly with obscure chemicals and vegetable ferments to transform their own bodies, and the bodies of their tiny human serfs. Their ultimate aim was the complete destruction of the insect hordes which held the continents in servile bondage.

More relentless than the insects, they moved grimly toward appalling ends. Their dream of perfection was immediate, personal. Lacking the selfless minds of the ants and bees they dreamed of glutinous absorption, of sense-channeled delights. Swaying immense in their tall shells they sought to surround themselves with purely nutritive pleasures. It was the females who dreamed

thus. The little shrunken males were mere complementary mockeries which scuttled ignominiously about in the vicinity of their mates.

The sense of contempt tinged with mockery which the female barnacles experienced in the presence of their complements flowed outward and enveloped their little human servitors. With a kind of malignant cosmic irony they dreamed of restoring the balance in a lowly sphere of being by making the women of the human race as relatively enormous as themselves, and reducing the males to physical and mental insignificance. It was an utterly malicious dream, evoked by enforced idleness, the produce of immense power seeking to sate itself in trivial cruelties.

THE TWO little swimmers were now abreast of the great circular summits of the barnacle shells. Seizing hold of a ladder-shaped polyp, they ascended the rounded eminence, and flicked the water from their bodies. The surface which supported them was vibrant with the slow, rhythmic movements of the Barnacle Masters in their sea-immersed houses.

Through tiny slits in the summits of the domed shells they could glimpse the great forms within as they floated upright in slothful majesty.

Clulan sighed in bitter foreboding, gazed downward and outward at the jasper sea beneath, and the tiny human forms that flecked it. Thousands of little figures were disporting themselves in the cliffward curving swells, some still diving for foodstuffs, and others merely swimming for recreation.

Clulan looked at Sla. "Will you return at once to the laboratories?" he asked.

Sla nodded. "Yes, Clulan. All is in readiness there. The new glandular secretion will be poured from its immense vat before the sun grows bright again."

Clulan's face was taut with apprehension. "And it is this gland substance which they will inject into our veins, to shrivel, and perhaps destroy us?"

"Yes," assented Sla. "They have wrought such incredible technical miracles in the last sun-cycle, Clulan, that they are mad with impatience to release their slumbering creativeness on some one or something. In another cycle they will subdue the continents as they have subdued the sea, but they are still unprepared for that awful and titanic conflict. The hive and tunnel hordes are still too wary, too powerful. But the chemical caverns hold much that is terrible even now—immense troughs of corrosive plants, body-transforming chemicals. In another cycle they will enwrap the terrestrial sphere in flame and carnage."

A shudder convulsed Clulan's small body. He looked downward through a dark, sun-baked slit in the shell at the wavering bulk beneath. It seemed almost unbelievable to him that a form so majestic and omniscient could harbor such malice. Awe and adoration contended with rebellious resentment in his mind. If they did *that* to him, could he still loyally serve them?

Sla said: "I must go now, Clulan. Perhaps they will pity us in the end. All the little ones who have selflessly served will prostrate ourselves in humble supplication when the great vat turns and the gland substance streams forth. We will plead for you—and for ourselves. But chiefly for you who swim in the depths, and have mates who love you. We are feeble of body, and if they shrink us"—he shrugged—"it will not matter so much."

He turned then, and moved swiftly toward a round dark aperture in the cliff wall. Hundreds of similar vents dotted the immense stone surface behind the summits of the barnacle shells, some leading to the laboratory caverns

in the sunless depths of subterranean arteries cut in the cliff's spacious interior; others to dark food chambers where the garnerings of the little servitors rested in frigid containers against moisture-dripping walls. Still other apertures led to the rectangular dwelling chambers of the servitors and their mates.

In pitying sorrow Clulan watched the stooped and emaciated form of the laboratory worker advance toward the vent, and disappear. He sighed, took one last somber look at the sun-reddened sea far beneath, and walked swiftly toward the only aperture which led to peace and serenity and momentary forgetfulness in the blue depths of the tall cliff.

He walked slowly along a low, damp passage, stooping from time to time to avoid grazing his scalp against low-hanging stalactites and sharp projections in the solid rock. For an interminable distance he repeated these stoopings, passing farther and farther into the cliff, his little human mind shedding its grim fears and growing more serene as he advanced.

Presently light burst upon his vision, and he emerged into a rectangular chamber with burnished stone walls, and a sloping floor of veined felspar. As he emerged from the tunnel a slim, white form arose from a recumbent position, and advanced toward him. She was a creature of unusual loveliness, with large dark eyes, and wondrously curving lashes. Her pale skin and long silvery hair which descended fanwise to her waist endowed her with an elusive, almost ghostly, beauty as she stood waiting expectantly in the center of the chamber.

WITH joyful exclamation he advanced and clasped her. Her lips softly caressed his bearded face as he pressed her to him. Gently he twined his fingers in her hair and turned them slowly about, inflicting a slight, tender pain.

For an instant their cheeks met in sudden ecstasy. Then, slowly, reluctantly, he released her.

She stood looking at him with glowing eyes. "You look tired," she murmured. "My sweet, little one."

It was a term of endearment which she had used a thousand times in the course of their life together. But now the adjective sent a cold chill to the core of his being. He trembled, turned pale.

Her eyes widened in surprise. "Why, what is the matter, my little one——"

He uttered a muffled groan and stopped her mouth with his hand. Then he led her firmly to a repose slab in the wall and settled down beside her.

Her eyes met his in a troubled stare. "What is it, Clulan?" she pleaded. "I await the truth without fear. Have you met some one who——"

Clulan shook his head, ran his palm tenderly over her cheeks and forehead, "There will never be another," he said. "You *know* that, Mutal. We are one body, one mind forever."

"Then what is it?"

"I swam shoreward with the laboratory worker, Sla. He knows many things which have been concealed from the food gatherers. The Tall Ones intend to——"

He bit his lips.

"Yes, Clulan."

"They intend to *shrink* us."

Horror flared in the woman's eyes. She sat bolt upright, in tremulous apprehension. "You mean, they will shrivel our bodies, Clulan?"

"They will not shrivel your body, Mutal," replied Clulan. "They will shrivel mine. They have found no adequate outlet for the immense energies which consume them. They are too feeble as yet to wage war on the tunnel and hive hordes, but they can amuse themselves by tormenting us. The pitiful smallness of their own mates has taught them contempt for all males. We

are ridiculous in their sight, and they intend to torture and humiliate us."

The woman's lips were trembling. "But can they do it, Clulan? Have they discovered a way?"

"They can easily alter our bodies, Mutal," said the little food gatherer. "A million years ago we had no webs between our toes. In the dim ages of the comet's dust, when changes in the earth's atmosphere immeasurably aided their development, and the development of the tunnel hordes, and our little kind nearly perished beneath the weight of the antarctic glaciations, there were no web-footed men. The men who now serve the tunnel and hive hordes are not web-footed. In their deep dark tunnels they walk with primitive toes. But the Tall Ones injected glandular secretions from web-footed mammals into the veins of our ancestors, and by slow stages we developed these hideous appendages. There is still something in us, a deeply buried instinctive loathing, which will not down. That is why we experience shame when we gaze upon our feet, which are so abnormal, so monstrous."

He made a curious sobbing sound in his throat. "Our feet are ugly, but more hideous still will be this new change, which will destroy what we treasure most—the tie that unites us, the sense of wonder and release which we experience when we are together. You will despise me, Mutal——"

"If they shrivel your body, Clulan," said Mutal, in a grim, tortured tone. "I will swim deeply into the water and die. I will never——"

Her speech was arrested by a sudden flare of prismatic light. Clulan's gaze leaped upward.

The circular visual transmitter in the chamber's roof was streaked with rapidly alternating banners of green and orange light. Across its glazed surface the signals wavered in ominous sequence.

Mutal gripped her mate's wrist with her thin fingers, sinking her nails into his flesh till he cried out in pain.

"Clulan," she murmured. "It is for you, your colors. *One of the Tall Ones has gone mad!*"

THE BLOOD drained from the little food gatherer's face as he stared. More terrible than any threat of shrinkage was the task to which he had been summoned; the hideous ordeal beneath the sea which would tax his energies beyond endurance and perhaps destroy him.

With a choking cry Mutal seized his head and drew it to her bosom. Tenderly she wept over him, swaying as she gazed deep into his tortured eyes.

She was familiar with the grim menace that lurked in the depths of the tall barnacle shell, and as her terrified mind envisioned the nerve-racking descent to the poisoned capitulum and the glaring mania in the eyes of the afflicted Tall One she clutched Clulan more firmly, and refused to release him.

Wallowing in their tall houses the female barnacles were not immune to disease. Weakened by slothful living, and the slaking of pernicious emotional urges, the huge, complicated minds in their capitulum occasionally cracked beneath the strain. So horrible was the ensuing disharmony that the mad forms became a menace to the entire community which only the little human servitors could surmount.

So tiny that they could slip with ease between the deadly lashing tentacles of the mad ones they were privileged to attack the great bodies with poisoned cutters, becoming for a moment in that strange reversion of function more powerful than the titan shapes they served. But the penalty of that brief usurpation of power was usually an appalling one, death lurking in every flick of the wildly weaving tentacles.

Gently but with grim tenacity Clulan

untwined Mutal's arms and drew himself up. His eyes were aglow with social consecration and the horrible caprices of the barnacles, their cold and arbitrary cruelties, were, for the instant forgotten. Once in a sun-cycle a barnacle went mad, and once in twenty sun-cycles one of the little food gatherers was summoned by the visual transmitter to contend with that awful horror in the depths.

The task fell alternately on laboratory workers, valve tenders, storehouse guards, and food gatherers, but it was now the food gatherers' turn, and among a hundred thousand potential saviors Clulan was the elected one; the tiny, consecrated purger of the community of barnacles, more powerful and omniscient in his little hour of dedication than the twenty thousand Tall Ones who majestically in their fathom-deep houses usurped the continental coast.

Mutal cried out to him in hysterical dismay, and attempted to restrain him as he moved toward the tunnel entrance by twining her arms about his legs. Tenderly, but with firmness, he released himself, pressed his nose to her forehead, and stepped into the tunnel.

Swiftly he sped along it, dodging the stalactites with agile dexterity. As he neared the cliff opening a shrill ululation impinged on his hearing and grew quickly louder as he pounded onward. It was a grimly ominous sound, and in his haste to emerge he nearly stumbled on the slippery stones beneath. His heart was thudding furiously, and his breath came in spasmodic jerks.

There were no longer any tiny human swimmers in the cliffward surging waves when he emerged and descended with incredible speed to the nearest domed shell. He stood for an instant on the summit of the dome, staring downward at the immense stretch of glistening water beneath him. The sun was very low now, and the waves were the hue of the blood in his veins.

A few gulls skimmed the unruffled surface far out, swooping, shrieking. To steady himself he gazed at the immense purplish arc of the heavens. His swift visual appraisal had imbued him with a sickening vertigo; a diffuse and queer kind of agony. It was as though a sharp cutter had rasped the edges of every nerve in his body.

Directly beneath him, about the sea-laved circumference of the great shell, the water was black with the dead of his kind. Thousands of little men and women floated there in the churning current. The great barnacle in its madness had sucked in all of the happy swimmers and spewed them forth with delirious rage.

It was the barnacle directly beneath him which had gone mad. Through the long cracks in the shell's summit he caught furtive glimpses of something huge and wet moving loathsomely about with an unnatural animation, and as he stared the ululation arose suddenly to intensify his terror, swelling till it deafened him, and then subsiding, and rising again. And when it fell to a thin, hideous wailing a churning sound from below usurped its function, and Clulan knew that the bodies of the crushed and mangled swimmers were flowing once more into the deep shell, drawn inward in the wake of a relentless suction.

A hand fastened on Clulan's shoulder. He turned about in swift affright. Then, slowly, the startled look faded from his countenance.

"Come with me quickly, Clulan," said the little laboratory worker. He was standing shivering on the dome, his thin body bent cliffward in urgent entreaty.

WITHOUT a word Clulan followed him. They entered the laboratory aperture, and passed swiftly between long tiers of low-hanging stalactites. Presently the passage widened, and they emerged into a cavern so enormous that its sloping roof was lost in swirling

vapors five hundred feet above their heads.

In grim awe Clulan followed his guide across the great chamber, passing unbelievable marvels as he progressed—enormous metallic vats a hundred feet in height, with luminous dials, and slowly revolving crystal wheels shining and flashing in the half-light, translucent, spore-breeding cylinders filled with many-hued growths so brilliant in hue that they cast a spell upon his senses, causing his eyes to smart and his brain to reel with a sick revulsion, cyclopean tiers of loathsome fungus tubes containing in their blue-lighted interiors growths more malignant than the virulent plants of the ant hordes; a thousand contrivances and repositories, cyclopean and hideous, glowing with technical menace, the fruit of milleniums of experimentation in the depths of the tall cliff.

Clulan followed Sla to the base of a thin inverted funnel of startling transparency which arose from a square, elevated base and spiraled upward in the uncertain light till it was lost in the mists above. Behind the bright surface a dark liquid rose and fell in the center of the funnel.

Sla swiftly thrust out his little hand and turned a metallic control mechanism at the base of the structure. The darkness deep within seemed to deepen and settle down in circular folds.

The laboratory worker said: "Give me your cutters, Clulan."

Clulan sat down and drew the cutters from his heel. He handed the sharp implements to Sla without a word. The muscles in his jaw were twitching. Sla held the cutters firmly, and advanced upon the funnel. With steady aim he hurled both cutters directly at the dark fluid. There was a tinkling murmur as of little bells ajangle as the thin, protective coating tore across.

The cutters were enveloped by the dark fluid. For an instant Sla stood in

silence waiting for them to grow cold with a frigidity that was beyond anything known to his little race in the days of its supremacy.

Presently from his loose body covering of translucent shill Sla drew a thin, sharp metallic instrument, and two soft pads of cold-resisting ditunite. Stooping, he enwrapped Clulan's little webbed feet in the pads. Then he drew forth a pair of ditunite hand coverings and twined them about his fingers. Holding the thin instrument securely he stepped forward, pierced the transparent surface skin of the funnel, and drew out the two cutters.

He slipped them quickly and securely over Clulan's ditunite-incased heels. "We must hurry," he whispered, in a tense tone.

The two tiny forms moved rapidly across the chamber. As Clulan's feet glided over the floor there arose a low hissing sound, and a thin blue vapor curled upward and enveloped his little person.

"If the cutters touch your flesh you will die in agony," warned Sla.

They passed between towering vats and tubes and horizontal disks slowly revolving. A look of terror was stenciled on Clulan's countenance as he progressed. He looked fearfully upward at the most menacing of the enormous vats—a rectangular bulk with burnished surface, flecked with immense luminous eyes that seemed to glare malignly down at him in the gloom. He sensed, however, that the eyes were in reality pouring vents through which the interior substance would descend in glutinous streams when the great lever at the base of the container moved downward.

"The gland vat?" he asked, clutching Sla's arm, and pointing. His voice was tremulous with foreboding.

"No," said Sla. "The gland vat is over there!" He turned slightly, and gestured toward the shadows behind him.

"But what—what is that then?"

"The Great Cold is resting there," replied Sla, in a grim tone.

CLULAN was near the dark inner entrance of the cliff-piercing tunnel; but at Sla's words he stopped abruptly, as though the cold in the cutters had penetrated his body, his mind. The Great Cold! Rumors, legends of it had penetrated even to the little abode chambers of the food gatherers in the cliffs.

"It would freeze all the seas between the continents," murmured Clulan, parroting statements he had heard, as his own ancestors had once mechanically repeated the names of mighty deities without form or substance as they squatted in terror on lonely, fire-etched hills in the early Pleistocene dawn. "It would destroy all life in the oceans. It would shrivel and kill every living thing."

Sla was gripping his arm, urging him onward. "We must hurry," he entreated.

Clulan shivered; threw off with an effort his panicky inertia. He passed into the tunnel, and sped swiftly along it. Sla followed, murmuring feverish advice in his thin, tremulous voice.

"When you strike, thrust deeply. Avoid the soft parts—strike directly at the base of the capitulum."

The hideous ululations of the mad barnacle increased ominously in volume as they neared the outer world. Clulan was the first to emerge. He ran swiftly along a sloping ledge of rock on the cliff's face and leaped downward to the rounded summit of the great shell.

Sla followed. For an instant the two little figures swayed unsteadily in the twilight. Then Clulan raised his palm and pressed it to the other's forehead in comradely salute.

"Farewell, Sla," he said. "You have been a loyal and generous friend."

Speedily he divested himself of his outer body-covering of translucent shill. His little frame gleamed ruddily as he

stood for an instant on the extremity of the sloping summit.

"Strike boldly, and avoid the lashing tentacles," warned Sla, with tears in his voice.

Grimly Clulan nodded. Raising his arms, he leaped vigorously outward and descended in a swift, graceful arc to the darkling water beneath.

His tiny body cleaved the surface film, and descended deeply. The water was no longer warm. As he righted himself in the purple depths something cold and rigid collided with his extremities. For an instant he stared through a wavering film into white, sightless eyes set in a pain-racked countenance. Tiny luminous crustaceans had clustered thickly about the hair of the submerged corpse, casting a ghostly radiance on its swollen features.

With reluctance Clulan raised his leg, and lashed at the gruesome obstruction with the cutter attached to his heel. The dead man divided as the cutter pierced him. The awful cold seared his flesh in an instant, and his body fell apart, and descended in two fragments.

Clulan knew then that he was armed with a technical weapon more deadly and effective than death ray or fungus spore, and a renewed confidence surged up within him.

He swam slowly toward the towering shell. The water grew brighter as he drew near to it, and presently through a murky film he saw the square mouth of a fathom-deep valve. His little countenance set in tense lines as he turned slowly about far under the sea and swam with even strokes toward the immense mad shape in the interior of the shell.

The water within was a churning maelstrom. As he passed through the valve an ascending current caught him up, and drew him swiftly in the direction of the demented Tall One's great crested capitulum. The capitulum quivered with purblind squirmings and lash-

ings, and the attached elastic peduncle, a hundred feet in width, was distended in fury.

Nearer and nearer to the great form he swirled. Two long tentacular legs ascended from their rigid sheaths and shot toward him. He turned swiftly, and lashed at them with his feet. One divided and fell away in the depths. The other knotted itself in swift menace. He plunged frantically downward as the circle of death shot past him, missing his little form by the fraction of a foot.

He turned over and over in the water. The current carried him swiftly upward again, in a straight line toward the barnacle's capitulum. A hundred feet it towered in the dark brine, its hooded summit glued to the great shell far above, its blood-red lower segments quivering menacingly in the tides.

It swelled as he shot toward it. Straight into it he plunged, keeping his little body poised with swift and frenzied arm lashings and manipulating the cutters with deadly accuracy. Twice the unearthly cold seared the great form's swollen bulk as Clulan's heels cut across it.

For an instant the little food gatherer swirled about in the unimpeded current. Then two more tentacles arose, churning the dark water as they darted toward him. He plunged between their nooselike coils and returned to the swollen head.

Again and again he jabbed at it with his heels. The entire capitulum quivered as the cutters pierced it. Then, horribly, the lower segments divided and fell away, descending into the black depths beneath. Quivering downward they sank, carrying their hideous seeds of madness, until nothing remained of the great shape but a drained and empty hood that swayed sluggishly in the tides.

Relief and joy flooded Clulan's tiny being. He turned exultantly about in the darkness, and swam with robust strokes to the surface of the water.

AS HE emerged beneath the dome a small black shape scuttled quickly toward him. From its lair beneath the summit of the great shell the little male barnacle had watched the glare slowly fade from the hood of its mate; had heard the frenzied ululations diminish and subside.

It hung suspended from a rock ledge immediately above the swimming form of the little food gatherer and watched him intently as he cleaved the black water. A kind of bestial joy, degraded and mirthless, was stamped on every lineament of its small wrinkled head.

As Clulan floundered it stretched forth a thin leg and lifted him from the water. Setting him firmly on the ledge it retreated a pace with a shrill cry. Clulan knew then that he was safe; that the little form would not harm him.

In its degenerate, nearly mindless fashion it was convulsed with gratitude.

As Clulan rested on the ledge staring at the little creature's joy-contorted head his exaltation vanished, and a great wave of horror and loathing flooded his being. He remembered; he understood. With relentless clarity the menace that overhung the males of his own little race returned hideously to his mind and assumed a sickening imminence.

He had contended in vain in the dark water. His reward would be eternal shame and ignominy, and there could be no peace for him beneath the glimmering constellations. The little barnacle felt no sorrow. It was consumed with a cold and hellish joy; a degenerate gratitude. Its long bondage was over. It was free now to starve slowly beside its slain mate, and even the wet rot which would soon consume its shriveled body-segments would be less difficult to bear than the shame it had endured in life.

It was to Clulan's credit that he was incapable of self-deception. He perceived with realistic clarity that he

would hate his dear little one with a consuming hate if they shriveled him. And when she died—his brain grew cold with the horror of the image that loomed.

He got up, stared for an instant at the little barnacle with a consuming pity. Then he turned, and ascended swiftly to the surface of the dome. Dexterously he heaved himself up over wet and glistening rock projections, and emerged through a crevice on the surface of the great shell.

Hundreds of tiny white forms came flocking about him with joyous cries. Foremost in the throng was his little mate, and as his gaze enveloped her a brief, fierce joy surged up in him again. He took her with avid huggings to his bosom.

The encircling men and women prostrated themselves before him, clung to his wet legs, embraced his shoulders with worshipful cries. It was his little hour of victory.

For a brief moment Clulan towered godlike beneath the gleaming net of stars that spanned the luminous skyway above him. Sla touched his arm, whispered in awe:

"A moment such as this is worth all the years of tedious striving, Clulan. All of these people would die for you in an instant. They would hurl themselves into the waves below at your command. It is the intoxication of power, Clulan, the intoxication of glory. Your heroism flows out to them. They identify themselves with you, share in your triumphs. As I stand here beside you I can feel the current flowing outward. It envelops me, and I share in the glory and power. Great deeds enoble, Clulan. They seem to exist in themselves, as sentient realities, and when their aura descends upon us we become transfigured, transformed. Are you not proud, Clulan?"

Gently Clulan set Mutal down, turned about till he was staring directly into

the worshipful eyes of the little laboratory worker.

"I am not proud, Sla. I am ashamed, ashamed. We are the heirs of a mean destiny. Yet if I should dare boldly now——"

Madly the little figures continued to press about him, shouting, chanting, extolling his heroism in a frenzy of adoration. He swayed for an instant in the press, holding Mutal grimly to him with his vigorous right arm, as though reluctant to relinquish her precious, slender form—to relinquish all the sweetness and wonder that had sustained his little life for so long.

Mutal murmured: "You are tired, my dear little one. Let us go quickly into the rock."

Clulan drew her swiftly to him, welded his countenance to hers. For an instant tears stung his eyelids. Then he freed himself, stood erect.

"Come!" he shouted.

THE THRONG divided in wonder as he advanced across the domed shell, and entered the laboratory vent. In the dark entrance he paused an instant, raised his hand in fervent appeal.

"Follow me!" he cried.

Down the wide tunnel he sped. Beneath the uneven stone roof his little form leaped forward, with chest out-thrust and head thrown back in exultant triumph.

A sense of godlike power flooded his midget being. Five thousand of his kind followed swiftly at his heels. Sla ran beside him, clutching at his arm in sudden apprehension.

"Go with Mutal into the rock," he panted. "You are tired, distraught. You are violating the sanctity of the cavern. Give heed to me, Clulan. You are courting disaster——"

But Clulan was deaf to advice. He sped onward, turning from time to time to beckon and shout. And presently he

was in the great cavern itself, and the little forms that obeyed him blindly were all about him, awaiting his commands.

With a kind of oracular majesty he flung up his arm, and pointed into the shadows toward the towering receptacle of the Great Cold.

"Climb up, all of you. Pull down the lever."

Exclamations of terror and amazement burst from the throats of the little servitors who adored him. Some fell prone in supplication and entreaty, torn between reluctance and desire. Others turned and fled, with paling cheeks. But the majority obeyed his grim command.

They ascended with shrill cries, clustering upon the immense metallic lever till it was completely covered with their small white bodies. For a moment the midget shapes twisted and turned in the dim, blue-lighted cavern, high in the air above Clulan's swaying form. Then slowly, terribly, the squirming human mass descended, and the great vat turned.

As the lever moved downward the vat slanted, and the luminous eyes far above opened automatically in its cyclopean bulk. The glow vanished and a dark opacity usurped the pouring vents and—

Enwrapped in the white flame of a superhuman daring Clulan gazed swiftly about him. He was not alone on the ground. Several of the little men and

women had ignored his command, and were standing entwined in one another's arms, oblivious of the horror that loomed.

As his gaze swept the unheeding forms all the exaltation and power seemed to ebb from him, to flow away in a dark, remorseless tide. He swayed backward in mute agony.

As he did so a slender woman emerged from the shadows and ran swiftly toward him. Encircling him with her arms, she pressed her cheek fervently to his, and stared fearlessly upward. Her silver hair descended fanwise to her waist, giving her a spectral look in the vast, dim cavern. From somewhere near at hand the voice of the little laboratory worker said:

"Farewell, Clulan. Death is a dark, bitter fruit. But the core—the core is luminous, Clulan. When the rind is gone all the darkness will vanish forever."

Clulan felt suddenly godlike again. Enwrapped in a sustaining aura of love and friendship he stared upward with unwavering vision into the dark drooping face of the Great Cold.

"You are wrong, Sla," he said, quietly. "The entire fruit is luminous now."

As he spoke the Great Cold descended upon him in a black, engulfing wave and spread slowly outward, ending forever his rebellious human dream and the long bright noon of the barnacles.

Next Month

MIND OF THE WORLD

by NAT SCHACHNER

The title gives but a hint of the absorbing theme of this story.



*He shifted the girl to his left arm, then fired into the
leaping horrors above.*

Parasite Planet

Two humans beat their way through the peculiar—and perilous—Venusian jungle. A masterpiece of fantasy

by STANLEY G. WEINBAUM

Illustrated by Elliot Dold

LUCKILY for "Ham" Hammond it was mid-winter when the mud-spout came. Mid-winter, that is, in the Venusian sense, which is nothing at all like the conception of the season generally entertained on Earth, except possibly, by dwellers in the hotter regions of the Amazon basin, or the Congo.

They, perhaps, might form a vague mental picture of winter on Venus by visualizing their hottest summer days, multiplying the heat, discomfort and unpleasant denizens of the jungle by ten or twelve.

On Venus, as is now well known, the seasons occur alternately in opposite hemispheres, as on the Earth, but with a very important difference. Here, when North America and Europe swelter in summer, it is winter in Australia and Cape Colony and Argentina. It is the northern and southern hemispheres which alternate their seasons.

But on Venus, very strangely, it is the eastern and western hemispheres, because the seasons of Venus depend, not on inclination to the plane of the ecliptic, but on libration. Venus does not rotate, but keeps the same face always toward the Sun, just as the Moon does toward the earth. One face is forever daylight, and the other forever night, and only along the twilight zone, a strip five hundred miles wide, is human habitation possible, a thin ring of territory circling the planet.

Toward the sunlit side it verges into the blasting heat of a desert where only a few Venusian creatures live, and on the night edge the strip ends abruptly in the colossal ice barrier produced by the condensation of the upper winds that sweep endlessly from the rising air of the hot hemisphere to cool and sink and rush back again from the cold one.

The chilling of warm air always produces rain, and at the edge of the darkness the rain freezes to form these great ramparts. What lies beyond, what fantastic forms of life may live in the starless darkness of the frozen face, or whether that region is as dead as the airless Moon—those are mysteries.

But the slow libration, a ponderous wabbling of the planet from side to side, does produce the effect of seasons. On the lands of the twilight zone, first in one hemisphere and then the other, the cloud-hidden Sun seems to rise gradually for fifteen days, then sink for the same period. It never ascends far, and only near the ice barrier does it seem to touch the horizon; for the libration is only seven degrees, but it is sufficient to produce noticeable fifteen-day seasons.

But such seasons! In the winter the temperature drops sometimes to a humid but bearable ninety, but, two weeks later, a hundred and forty is a cool day near the torrid edge of the zone. And always, winter and sum-

mer, the intermittent rains drip sullenly down to be absorbed by the spongy soil and given back again as sticky, unpleasant, unhealthy steam.

And that, the vast amount of moisture on Venus, was the greatest surprise of the first human visitors; the clouds had been seen, of course, but the spectroscope denied the presence of water, naturally, since it was analyzing light reflected from the upper cloud surfaces, fifty miles above the planet's face.

That abundance of water has strange consequences. There are no seas or oceans on Venus, if we expect the probability of vast, silent, and eternally frozen oceans on the sunless side. On the hot hemisphere evaporation is too rapid, and the rivers that flow out of the ice mountains simply diminish and finally vanish, dried up.

A further consequence is the curiously unstable nature of the land of the twilight zone. Enormous subterranean rivers course invisibly through it, some boiling, some cold as the ice from which they flow. These are the cause of the mud eruptions that make human habitation in the Hotlands such a gamble; a perfectly solid and apparently safe area of soil may be changed suddenly into a boiling sea of mud in which buildings sink and vanish, together, frequently, with their occupants.

There is no way of predicting these catastrophes; only on the rare outcroppings of bed rock is a structure safe, and so all permanent human settlements cluster about the mountains.

HAM HAMMOND was a trader. He was one of those adventurous individuals who always appear on the frontiers and fringes of habitable regions. Most of these fall into two classes; they are either reckless dare-devils pursuing danger, or outcasts, criminal or otherwise, pursuing either solitude or forgetfulness.

Ham Hammond was neither. He was pursuing no such abstractions, but the good, solid lure of wealth. He was, in fact, trading with the natives for the spore-pods of the Venusian plant *xixtchil*, from which terrestrial chemists would extract trihydroxyl-tertiary-tolunitrile-beta-anthraquinone, the *xixt*-line or triple-T-B-A that was so effective in rejuvenation treatments.

Ham was young and sometimes wondered why rich old men—and women—would pay such tremendous prices for a few more years of virility, especially as the treatments didn't actually increase the span of life, but just produced a sort of temporary and synthetic youth.

Gray hair darkened, wrinkles filled out, bald heads grew fuzzy, and then, in a few years, the rejuvenated person was just as dead as he would have been, anyway. But as long as triple-T-B-A commanded a price about equal to its weight in radium, why, Ham was willing to take the gamble to obtain it.

He had never really expected the mudspout. Of course it was an ever-present danger, but when, staring idly through the window of his shack over the writhing and steaming Venusian plain, he had seen the sudden boiling pools erupting all around, it had come as a shocking surprise.

For a moment he was paralyzed; then he sprang into immediate and frantic action. He pulled on his enveloping suit of rubberlike transkin; he strapped the great bowls of mudshoes to his feet; he tied the precious bag of spore-pods to his shoulders, packed some food, and then burst into the open.

The ground was still semisolid, but even as he watched, the black soil boiled out around the metal walls of the shack, the cube tilted a trifle, and then sank deliberately from sight, and the mud sucked and gurgled as it closed gently above the spot.

Ham caught himself. One couldn't stand still in the midst of a mudspout, even with the bowl-like mudshoes as support. Once let the viscous stuff flow over the rim and the luckless victim was trapped; he couldn't raise his foot against the suction, and first slowly, then more quickly, he'd follow the shack.

So Ham started off over the boiling swamp, walking with the peculiar sliding motion he had learned by much practice, never raising the mudshoes above the surface, but sliding them along, careful that no mud topped the curving rim.

It was a tiresome motion, but absolutely necessary. He slid along as if on snowshoes, bearing west because that was the direction of the dark side, and if he had to walk to safety, he might as well do it in coolness. The area of swamp was unusually large; he covered at least a mile before he attained a slight rise in the ground, and the mudshoes clumped on solid, or nearly solid, soil.

He was bathed in perspiration, and his transkin suit was hot as a boiler room, but one grows accustomed to that on Venus. He'd have given half his supply of xixtchil pods for the opportunity to open the mask of the suit, to draw a breath of even the steamy and humid Venusian air, but that was impossible; impossible, at least, if he had any inclination to continue living.

One breath of unfiltered air anywhere near the warm edge of the twilight zone was quick and very painful death; Ham would have drawn in uncounted millions of the spores of those fierce Venusian molds, and they'd have sprouted in furry and nauseating masses in his nostrils, his mouth, his lungs, and eventually in his ears and eyes.

Breathing them wasn't even a necessary requirement; once he'd come upon a trader's body with the molds springing from his flesh. The poor fellow

had somehow torn a rip in his transkin suit, and that was enough.

The situation made eating and drinking in the open a problem on Venus; one had to wait until a rain had precipitated the spores, when it was safe for half an hour or so. Even then the water must have been recently boiled and the food just removed from its can; otherwise, as had happened to Ham more than once, the food was apt to turn abruptly into a fuzzy mass of molds that grew about as fast as the minute hand moved on a clock. A disgusting sight! A disgusting planet!

THAT last reflection was induced by Ham's view of the quagmire that had engulfed his shack. The heavier vegetation had gone with it, but already avid and greedy life was emerging, wriggling mud grass and the bulbous fungi called "walking balls." And all around a million little slimy creatures slithered across the mud, eating each other rapaciously, being torn to bits, and each fragment re-forming to a complete creature.

A thousand different species, but all the same in one respect; each of them was all appetite. In common with most Venusian beings, they had a multiplicity of both legs and mouths; in fact some of them were little more than blobs of skin split into dozens of hungry mouths, and crawling on a hundred spidery legs.

All life on Venus is more or less parasitic. Even the plants that draw their nourishment directly from soil and air have also the ability to absorb and digest—and, often enough, to trap—animal food. So fierce is the competition on that humid strip of land between the fire and the ice that one who has never seen it must fail even to imagine it.

The animal kingdom wars incessantly on itself and the plant world; the vegetable kingdom retaliates, and frequently outdoes the other in the pro-

duction of monstrous predatory horrors that one would even hesitate to call plant life. A terrible world!

In the few moments that Ham had paused to look back, ropy creepers had already entangled his legs; transkin was impervious, of course, but he had to cut the things away with his knife, and the black, nauseating juices that flowed out of them smeared on his suit and began instantly to grow furry as the molds sprouted. He shuddered.

"Hell of a place!" Ham growled, stooping to remove his mudshoes, which he slung carefully over his back.

He slogged away through the writhing vegetation, automatically dodging the awkward thrusts of the Jack Ketch trees as they cast their nooses hopefully toward his arms and head.

Now and again he passed one that dangled some trapped creature, usually unrecognizable because the molds had enveloped it in a fuzzy shroud, while the tree itself was placidly absorbing victim and molds alike.

"Horrible place!" Ham muttered, kicking a writhing mass of nameless little vermin from his path.

He mused; his shack had been situated rather nearer the hot edge of the twilight zone; it was a trifle over two hundred and fifty miles to the shadow line, though of course that varied with the libration. But one couldn't approach the line too closely, anyway, because of the fierce, almost inconceivable, storms that raged where the hot upper winds encountered the icy blasts of the night side, giving rise to the birth throes of the ice barrier.

So a hundred and fifty miles due west would be sufficient to bring coolness, to enter a region too temperate for the molds, where he could walk in comparative comfort. And then, not more than fifty miles north, lay the American settlement Erotia, named, obviously, after that troublesome mythical son of Venus, Cupid.

Intervening, of course, were the ranges of the Mountains of Eternity, not those mighty twenty-mile-high peaks whose summits are occasionally glimpsed by Earthly telescopes, and that forever sunder British Venus from the American possessions, but, even at the point he planned to cross, very respectable mountains indeed. He was on the British side now; not that any one cared. Traders came and went as they pleased.

Well, that meant about two hundred miles. No reason why he couldn't make it; he was armed with both automatic and flame-pistol, and water was no problem, if carefully boiled. Under pressure of necessity, one could even eat Venusian life—but it required hunger and thorough cooking and a sturdy stomach.

It wasn't the taste so much as the appearance, or so he'd been told. He grimaced; beyond doubt he'd be driven to find out for himself, since his canned food couldn't possibly last out the trip. Nothing to worry about, Ham kept telling himself. In fact, plenty to be glad about; the xixtchil pods in his pack represented as much wealth as he could have accumulated by ten years of toil back on Earth.

No danger—and yet, men had vanished on Venus, dozens of them. The molds had claimed them, or some fierce unearthly monster, or perhaps one of the many unknown living horrors, both plant and animal.

Ham trudged along, keeping always to the clearings about the Jack Ketch trees, since these vegetable omnivores kept other life beyond the reach of their greedy nooses. Elsewhere progress was impossible, for the Venusian jungle presented such a terrific tangle of writhing and struggling forms that one could move only by cutting the way, step by step, with infinite labor.

Even then there was the danger of Heaven only knew what fanged and

venomous creatures whose teeth might pierce the protective membrane of transkin, and a crack in that meant death. Even the unpleasant Jack Ketch trees were preferable company, he reflected, as he slapped their questing lariats aside.

Six hours after Ham had started his involuntary journey, it rained. He seized the opportunity, found a place where a recent mudspout had cleared the heavier vegetation away, and prepared to eat. First, however, he scooped up some scummy water, filtered it through the screen attached for that purpose to his canteen, and set about sterilizing it.

Fire was difficult to manage, since dry fuel is rare indeed in the Hotlands of Venus, but Ham tossed a thermide tablet into the liquid, and the chemicals boiled the water instantly, escaping themselves as gases. If the water retained a slight ammoniacal taste—well, that was the least of his discomforts, he mused, as he covered it and set it by to cool.

He uncapped a can of beans, watched a moment to see that no stray molds had remained in the air to infect the food, then opened the visor of his suit and swallowed hastily. Thereafter he drank the blood-warm water and poured carefully what remained into the water pouch within his transkin, where he could suck it through a tube to his mouth without the deadly exposure to the molds.

Ten minutes after he had completed the meal, while he rested and longed for the impossible luxury of a cigarette, the fuzzy coat sprang suddenly to life on the remnants of food in the can.

II.

AN HOUR later, weary and thoroughly soaked in perspiration, Ham found a Friendly tree, so named by the explorer Burlingame because it is

one of the few organisms on Venus sluggish enough to permit one to rest in its branches. So Ham climbed it, found the most comfortable position available, and slept as best he could.

It was five hours by his wrist watch before he awoke, and the tendrils and little sucking cups of the Friendly tree were fastened all over his transkin. He tore them away very carefully, climbed down, and trudged westward.

It was after the second rain that he met the doughpot, as the creature is called in British and American Venus. In the French strip, it's the *pot à colle*, the "paste pot;" in the Dutch—well, the Dutch are not prudish, and they call the horror just what they think it warrants.

Actually, the doughpot is a nauseous creature. It's a mass of white, dough-like protoplasm, ranging in size from a single cell to perhaps twenty tons of mushy filth. It has no fixed form; in fact, it's merely a mass of de Proust cells—in effect, a disembodied, crawling, hungry cancer.

It has no organization and no intelligence, nor even any instinct save hunger. It moves in whatever direction food touches its surfaces; when it touches two edible substances, it quietly divides, with the larger portion invariably attacking the greater supply.

It's invulnerable to bullets; nothing less than the terrific blast of a flame-pistol will kill it, and then only if the blast destroys every individual cell. It travels over the ground absorbing everything, leaving bare black soil where the ubiquitous molds spring up at once—a noisome, nightmarish creature.

Ham sprang aside as the doughpot erupted suddenly from the jungle to his right. It couldn't absorb the transkin, of course, but to be caught in that pasty mess meant quick suffocation. He glared at it disgustedly and was sorely tempted to blast it with his flame-pistol as it slithered past at running speed.

He would have, too, but the experienced Venusian frontiersman is very careful with the flame-pistol.

It has to be charged with a diamond, a cheap black one, of course, but still an item to consider. The crystal, when fired, gives up all its energy in one terrific blast that roars out like a lightning stroke for a hundred yards, incinerating everything in its path.

The thing rolled by with a sucking and gulping sound. Behind it opened the passage it had cleared; creepers, snake vines, Jack Ketch trees—everything had been swept away down to the humid earth itself, where already the molds were springing up on the slime of the doughpot's trail.

The alley led nearly in the direction Ham wanted to travel; he seized the opportunity and strode briskly along, with a wary eye, nevertheless, on the ominous walls of jungle. In ten hours or so the opening would be filled once more with unpleasant life, but for the present it offered a much quicker progress than dodging from one clearing to the next.

It was five miles up the trail, which was already beginning to sprout inconveniently, that he met the native galloping along on his four short legs, his pincerlike hands shearing a path for him. Ham stopped for a palaver.

"*Murra*," he said.

The language of the natives of the equatorial regions of the Hotlands is a queer one. It has, perhaps, two hundred words, but when a trader has learned those two hundred, his knowledge of the tongue is but little greater than the man who knows none at all.

The words are generalized, and each sound has anywhere from a dozen to a hundred meanings. *Murra*, for instance, is a word of greeting; it may mean something much like "hello," or "good morning." It also may convey a challenge—"on guard!" It means be-

sides, "Let's be friends," and also, strangely, "Let's fight this out."

It has, moreover, certain noun senses; it means peace, it means war, it means courage, and, again, fear. A subtle language; it is only very recently that studies of inflection have begun to reveal its nature to human philologists. Yet, after all, perhaps English, with its "to," "too," and "two," its "one," "won," "wan," "wen," "win," "when," and a dozen other similarities, might seem just as strange to Venusian ears, untrained in vowel distinctions.

Moreover, humans can't read the expressions of the broad, flat, three-eyed Venusian faces, which in the nature of things must convey a world of information among the natives themselves.

But this one accepted the intended sense. "*Murra*," he responded, pausing. "*Usk?*" That was, among other things, "Who are you?" or "Where did you come from?" or "Where are you bound?"

Ham chose the latter sense. He pointed off into the dim west, then raised his hand in an arc to indicate the mountains. "*Erotia*," he said. That had but one meaning, at least.

The native considered this in silence. At last he grunted and volunteered some information. He swept his cutting claw in a gesture west along the trail. "*Curky*," he said, and then, "*Murra*." The last was farewell; Ham pressed against the wriggling jungle wall to permit him to pass.

Curky meant, together with twenty other senses, trader. It was the word usually applied to humans, and Ham felt a pleasant anticipation in the prospect of human company. It had been six months since he had heard a human voice other than that on the tiny radio now sunk with his shack.

TRUE ENOUGH, five miles along the doughpot's trail Ham emerged suddenly in an area where there had been

a recent mudspout. The vegetation was only waist-high, and across the quarter-mile clearing he saw a structure, a trading hut. But far more pretentious than his own iron-walled cubicle; this one boasted three rooms, an unheard-of luxury in the Hotlands, where every ounce had to be laboriously transported by rocket from one of the settlements. That was expensive, almost prohibitive. Traders took a real gamble, and Ham knew he was lucky to have come out so profitably.

He strode over the still spongy ground. The windows were shaded against the eternal daylight, and the door—the door was locked. This was a violation of the frontier code. One always left doors unlocked; it might mean the salvation of some strayed trader, and not even the most dishonorable would steal from a hut left open for his safety.

Nor would the natives; no creature is as honest as a Venusian native, who never lies and never steals, though he might, after due warning, kill a trader for his trade goods. But only after a fair warning.

Ham stood puzzled. At last he kicked and tramped a clear space before the door, sat down against it, and fell to snapping away the numerous and loathsome little creatures that swarmed over his transkin. He waited.

It wasn't half an hour before he saw the trader plowing through the clearing—a short, slim fellow; the transkin shaded his face, but Ham could make out large, shadowed eyes. He stood up.

"Hello!" he said jovially. "Thought I'd drop in for a visit. My name's Hamilton Hammond—you guess the nickname!"

The newcomer stopped short, then spoke in a curiously soft and husky voice, with a decidedly English accent. "My guess would be 'Boiled Pork,' I fancy." The tones were cold, un-

friendly. "Suppose you step aside and let me in. Good day!"

Ham felt anger and amazement. "The devil!" he snapped. "You're a hospitable sort, aren't you?"

"No. Not at all." The other paused at the door. "You're an American. What are you doing on British soil? Have you a passport?"

"Since when do you need a passport in the Hotlands?"

"Trading, aren't you?" the slim man said sharply. "In other words, poaching. You've no rights here. Get on."

Ham's jaw set stubbornly behind his mask. "Rights or none," he said, "I'm entitled to the consideration of the frontier code. I want a breath of air and a chance to wipe my face, and also a chance to eat. If you open that door I'm coming in after you."

An automatic flashed into view. "Do, and you'll feed the molds."

Ham, like all Venusian traders, was of necessity bold, resourceful, and what is called in the States "hard-boiled." He didn't flinch, but said in apparent yielding:

"All right; but listen, all I want is a chance to eat."

"Wait for a rain," said the other coolly and half turned to unlock the door.

As his eyes shifted, Ham kicked at the revolver; it went spinning against the wall and dropped into the weeds. His opponent snatched for the flame-pistol that still dangled on his hip; Ham caught his wrist in a mighty clutch.

Instantly the other ceased to struggle, while Ham felt a momentary surprise at the skinny feel of the wrist through its transkin covering.

"Look here!" he growled. "I want a chance to eat, and I'm going to get it. Unlock that door!"

He had both wrists now; the fellow seemed curiously delicate. After a mo-

ment he nodded, and Ham released one hand. The door opened, and he followed the other in.

AGAIN, unheard-of magnificence. Solid chairs, a sturdy table, even books, carefully preserved, no doubt, by lycopodium against the ravenous molds that sometimes entered Hotland shacks in spite of screen filters and automatic spray. An automatic spray was going now to destroy any spores that might have entered with the opening door.

Ham sat down, keeping an eye on the other, whose flame-pistol he had permitted to remain in its holster. He was confident of his ability to outdraw the slim individual, and, besides, who'd risk firing a flame-pistol indoors? It would simply blow out one wall of the building.

So he set about opening his mask, removing food from his pack, wiping his steaming face, while his companion—or opponent—looked on silently. Ham watched the canned meat for a moment; no molds appeared, and he ate.

"Why the devil," he rasped, "don't you open your visor?" At the other's silence, he continued: "Afraid I'll see your face, eh? Well, I'm not interested; I'm no cop."

No reply.

He tried again. "What's your name?"

The cool voice sounded: "Burlingame. Pat Burlingame."

Ham laughed. "Patrick Burlingame is dead, my friend. I knew him." No answer. "And if you don't want to tell your name, at least you needn't insult the memory of a brave man and a great explorer."

"Thank you." The voice was sardonic. "He was my father."

"Another lie. He had no son. He had only a——" Ham paused abruptly; a feeling of consternation swept over him. "Open your visor!" he yelled.

He saw the lips of the other, dim through the transkin, twitch into a sarcastic smile.

"Why not?" said the soft voice, and the mask dropped.

Ham gulped; behind the covering were the delicately modeled features of a girl, with cool gray eyes in a face lovely despite the glistening perspiration on cheeks and forehead.

The man gulped again. After all, he was a gentleman despite his profession as one of the fierce, adventurous traders of Venus. He was university-educated—an engineer—and only the lure of quick wealth had brought him to the Hotlands.

"I—I'm sorry," he stammered.

"You brave American poachers!" she sneered. "Are all of you so valiant as to force yourselves on women?"

"But—how could I know? What are you doing in a place like this?"

"There's no reason for me to answer your questions, but"—she gestured toward the room beyond—"I'm classifying Hotland flora and fauna. I'm Patricia Burlingame, biologist."

He perceived now the jar-inclosed specimens of a laboratory in the next chamber. "But a girl alone in the Hotlands! It's—it's reckless!"

"I didn't expect to meet any American poachers," she retorted.

He flushed. "You needn't worry about me. I'm going." He raised his hands to his visor.

Instantly Patricia snatched an automatic from the table drawer. "You're going, indeed, Mr. Hamilton Hammond," she said coolly. "But you're leaving your xixtchil with me. It's crown property; you've stolen it from British territory, and I'm confiscating it."

He stared. "Look here!" he blazed suddenly. "I've risked all I have for that xixtchil. If I lose it I'm ruined—busted. I'm not giving it up!"

"But you are."

He dropped his mask and sat down. "Miss Burlingame," he said, "I don't think you've nerve enough to shoot me, but that's what you'll have to do to get it. Otherwise I'll sit here until you drop of exhaustion."

Her gray eyes bored silently into his blue ones. The gun held steadily on his heart, but spat no bullet. It was a deadlock.

At last the girl said, "You win, poacher." She slapped the gun into her empty holster. "Get out, then."

"Gladly!" he snapped.

He rose, fingered his visor, then dropped it again at a sudden startled scream from the girl. He whirled, suspecting a trick, but she was staring out of the window with wide, apprehensive eyes.

HAM saw the writhing of vegetation and then a vast whitish mass. A doughpot—a monstrous one, bearing steadily toward their shelter. He heard the gentle *clunk* of impact, and then the window was blotted out by the pasty mess, as the creature, not quite large enough to engulf the building, split into two masses that flowed around and remerged on the other side.

Another cry from Patricia. "Your mask, fool!" she rasped. "Close it!"

"Mask? Why?" Nevertheless, he obeyed automatically.

"Why? That's why! The digestive acids—look!"

She pointed at the walls; indeed, thousands of tiny pinholes of light were appearing. The digestive acids of the monstrosity, powerful enough to attack whatever food chance brought, had corroded the metal; it was porous; the shack was ruined. He gasped as fuzzy molds shot instantly from the remains of his meal, and a red-and-green fur sprouted from the wood of chairs and table.

The two faced each other.

Ham chuckled. "Well," he said,

"you're homeless, too. Mine went down in a mudspout."

"Yours would!" Patricia retorted acidly. "You Yankees couldn't think of finding shallow soil, I suppose. Bed rock is just six feet below here, and my place is on pilons."

"Well, you're a cool devil! Anyway, your place might as well be sunk. What are you going to do?"

"Do? Don't concern yourself. I'm quite able to manage."

"How?"

"It's no affair of yours, but I have a rocket call each month."

"You must be a millionaire, then," he commented.

"The Royal Society," she said coldly, "is financing this expedition. The rocket is due—"

She paused; Ham thought she paled a little behind her mask.

"Due when?"

"Why—it just came two days ago. I'd forgotten."

"I see. And you think you'll just stick around for a month waiting for it. Is that it?"

Patricia stared at him defiantly.

"Do you know," he resumed, "what you'd be in a month? It's ten days to summer and look at your shack." He gestured at the walls, where brown and rusty patches were forming; at his motion a piece the size of a saucer tumbled in with a crackle. "In two days this thing will be a caved-in ruin. What'll you do during fifteen days of summer? What'll you do without shelter when the temperature reaches a hundred and fifty—a hundred and sixty? I'll tell you—you'll die."

She said nothing.

"You'll be a fuzzy mass of molds before the rocket returns," Ham said. "And then a pile of clean bones that will go down with the first mudspout."

"Be still!" she blazed.

"Silence won't help. Now I'll tell you what you can do. You can take

your pack and your mudshoes and walk along with me. We can make the Cool Country before summer—if you can walk as well as you talk."

"Go with a Yankee poacher? I fancy not!"

"And then," he continued imperturbably, "we can cross comfortably to Erotia, a good American town."

Patricia reached for her emergency pack, slung it over her shoulders. She retrieved a thick bundle of notes, written in aniline ink on transkin, brushed off a few vagrant molds, and slipped it into the pack. She picked up a pair of diminutive mudshoes and turned deliberately to the door.

"So you're coming?" he chuckled.

"I'm going," she retorted coldly, "to the good British town of Venoble. Alone!"

"Venoble!" he gasped. "That's two hundred miles south! And across the Greater Eternities, too!"

III.

PATRICIA walked silently out of the door and turned west toward the Cool Country. Ham hesitated a moment, then followed. He couldn't permit the girl to attempt that journey alone; since she ignored his presence, he simply trailed a few steps behind her, plodding grimly and angrily along.

For three hours or more they trudged through the endless daylight, dodging the thrusts of the Jack Ketch trees, but mostly following the still fairly open trail of the first doughpot.

Ham was amazed at the agile and lithe grace of the girl, who slipped along the way with the sure skill of a native. Then a memory came to him; she *was* a native, in a sense. He recalled now that Patrick Burlingame's daughter was the first human child born on Venus, in the colony of Venoble, founded by her father.

Ham remembered the newspaper arti-

cles when she had been sent to Earth to be educated, a child of eight; he had been thirteen then. He was twenty-seven now, which made Patricia Burlingame twenty-two.

Not a word passed between them until at last the girl swung about in exasperation.

"Go away" she blazed.

Ham halted. "I'm not bothering you."

"But I don't want a bodyguard. I'm a better Hotlander than you!"

He didn't argue the point. He kept silent, and after a moment she flashed:

"I hate you, Yankee! Lord, how I hate you!" She turned and trudged on.

An hour later the mudspout caught them. Without warning, watery muck boiled up around their feet, and the vegetation swayed wildly. Hastily, they strapped on their mudshoes, while the heavier plants sank with sullen gurgles around them. Again Ham marveled at the girl's skill; Patricia slipped away across the unstable surface with a speed he could not match, and he shuffled far behind.

Suddenly he saw her stop. That was dangerous in a mudspout; only an emergency could explain it. He hurried; a hundred feet away he perceived the reason. A strap had broken on her right shoe, and she stood helpless, balancing on her left foot, while the remaining bowl was sinking slowly. Even now black mud slopped over the edge.

She eyed him as he approached. He shuffled to her side; as she saw his intention, she spoke.

"You can't," she said.

Ham bent cautiously, slipping his arms about her knees and shoulders. Her mudshoe was already embedded, but he heaved mightily, driving the rims of his own dangerously close to the surface. With a great sucking gulp, she came free and lay very still in his arms, so as not to unbalance him as he slid again into careful motion over the

treacherous surface. She was not heavy, but it was a hairbreadth chance, and the mud slipped and gurgled at the very edge of his shoe-bowls. Even though Venus has slightly less surface gravitation than Earth, a week or so gets one accustomed to it, and the twenty per cent advantage in weight seems to disappear.

A hundred yards brought firm footing. He sat her down and unstrapped his mudshoes.

"Thank you," she said coolly. "That was brave."

"You're welcome," he returned dryly. "I suppose this will end any idea of your traveling alone. Without both mudshoes, the next spout will be the last for you. Do we walk together now?"

Her voice chilled. "I can make a substitute shoe from tree skin."

"Not even a native could walk on tree skin."

"Then," she said, "I'll simply wait a day or two for the mud to dry and dig up my lost one."

He laughed and gestured at the acres of mud. "Dig where?" he countered. "You'll be here till summer if you try that."

She yielded. "You win again, Yankee. But only to the Cool Country; then you'll go north and I south."

THEY trudged on. Patricia was as tireless as Ham himself and vastly more adept in Hotland lore. Though they spoke but little, he never ceased to wonder at the skill she had in picking the quickest route, and she seemed to sense the thrusts of the Jack Ketch trees without looking. But it was when they halted at last, after a rain had given opportunity for a hasty meal, that he had real cause to thank her.

"Sleep?" he suggested, and as she nodded: "There's a Friendly tree."

He moved toward it, the girl behind.

Suddenly she seized his arm. "It's a Pharisee!" she cried, jerking him back.

None too soon! The false Friendly tree had lashed down with a terrible stroke that missed his face by inches. It was no Friendly tree at all, but an imitator, luring prey within reach by its apparent harmlessness, then striking with knife-sharp spikes.

Ham gasped. "What is it? I never saw one of those before."

"A Pharisee! It just looks like a Friendly tree."

She took out her automatic and sent a bullet into the black, pulsing trunk. A dark stream gushed, and the ubiquitous molds sprang into life about the hole. The tree was doomed.

"Thanks," said Ham awkwardly. "I guess you saved my life."

"We're quits now." She gazed levelly at him. "Understand? We're even."

Later they found a true Friendly tree and slept. Awakening, they trudged on again, and slept again, and so on for three nightless days. No more mud-spouts burst about them, but all the other horrors of the Hotlands were well in evidence. Doughpots crossed their path, snake vines hissed and struck, the Jack Ketch trees flung sinister nooses, and a million little crawling things writhed underfoot or dropped upon their suits.

Once they encountered a uniped, that queer, kangaroolike creature that leaps, crashing through the jungle on a single mighty leg, and trusts to its ten-foot beak to spear its prey.

When Ham missed his first shot, the girl brought it down in mid-leap to thresh into the avid clutches of the Jack Ketch trees and the merciless molds.

On another occasion, Patricia had both feet caught in a Jack Ketch noose that lay for some unknown cause on the ground. As she stepped within it, the

tree jerked her suddenly, to dangle head down a dozen feet in the air, and she hung helplessly until Ham managed to cut her free. Beyond doubt, either would have died alone on any of several occasions; together they pulled through.

Yet neither relaxed the cool, unfriendly attitude that had become habitual. Ham never addressed the girl unless necessary, and she in the rare instances when they spoke, called him always by no other name than Yankee poacher. In spite of this, the man found himself sometimes remembering the piquant loveliness of her features, her brown hair and level gray eyes, as he had glimpsed them in the brief moments when rain made it safe to open their visors.

At last one day a wind stirred out of the west, bringing with it a breath of coolness that was like the air of heaven to them. It was the underwind, the wind that blew from the frozen half of the planet, that breathed cold from beyond the ice barrier. When Ham experimentally shaved the skin from a writhing weed, the molds sprang out more slowly and with encouraging sparseness; they were approaching the Cool Country.

They found a Friendly tree with lightened hearts; another day's trek might bring them to the uplands where one could walk unhooded, in safety from the molds, since these could not sprout in a temperature much below eighty.

Ham woke first. For a while he gazed silently across at the girl, smiling at the way the branches of the tree had encircled her like affectionate arms. They were merely hungry, of course, but it looked like tenderness. His smile turned a little sad as he realized that the Cool Country meant parting, unless he could discourage that insane determination of hers to cross the Greater Eternities.

He sighed, and reached for his pack slung on a branch between them, and suddenly a bellow of rage and astonishment broke from him.

His xixtchil pods! The transkin pouch was slit; they were gone.

Patricia woke startled at his cry. Then, behind her mask, he sensed an ironic, mocking smile.

"My xixtchil!" he roared. "Where is it?"

She pointed down. There among the lesser growths was a little mound of molds.

"There," she said coolly. "Down there, poacher."

"You——" He choked with rage.

"Yes. I slit the pouch while you slept. You'll smuggle no stolen wealth from British territory."

Ham was white, speechless. "You damned devil!" he bellowed at last. "That's every cent I had!"

"But stolen," she reminded him pleasantly, swinging her dainty feet.

Rage actually made him tremble. He glared at her; the light struck through the translucent transkin, outlining her body and slim rounded legs in shadow. "I ought to kill you!" he muttered tensely.

His hand twitched, and the girl laughed softly. With a groan of desperation, he slung his pack over his shoulders and dropped to the ground.

"I hope—I hope you die in the mountains," he said grimly, and stalked away toward the west.

A hundred yards distant he heard her voice.

"Yankee! Wait a moment!"

He neither paused nor glanced back, but strode on.

HALF AN HOUR later, glancing back from the crest of a rise, Ham perceived that she was following him. He turned and hurried on. The way was upward now, and his strength began to outweigh her speed and skill.

When next he glimpsed her, she was a plodding speck far behind, moving, he imagined, with a weary doggedness. He frowned back at her; it had occurred to him that a mudspout would find her completely helpless, lacking the vitally important mudshoes.

Then he realized that they were beyond the region of mudspouts, here in the foothills of the Mountains of Eternity, and anyway, he decided grimly, he didn't care.

For a while Ham paralleled a river, doubtless an unnamed tributary of the Phlegethon. So far there had been no necessity to cross watercourses, since naturally all streams on Venus flow from the ice barrier across the twilight zone to the hot side, and therefore had coincided with their own direction.

But now, once he attained the table-lands and turned north, he would encounter rivers. They had to be crossed either on logs or, if opportunity offered and the stream was narrow, through the branches of Friendly trees. To set foot in the water was death; fierce fanged creatures haunted the streams.

He had one near catastrophe at the rim of the table-land. It was while he edged through a Jack Ketch clearing; suddenly there was a heave of white corruption, and tree and jungle wall disappeared in the mass of a gigantic doughpot.

He was cornered between the monster and an impenetrable tangle of vegetation, so he did the only thing left to do. He snatched his flame-pistol and sent a terrific, roaring blast into the horror, a blast that incinerated tons of pasty filth and left a few small fragments crawling and feeding on the débris.

The blast also, as it usually does, shattered the barrel of the weapon. He sighed as he set about the forty-minute job of replacing it—no true Hotlander ever delays that—for the blast had cost

fifteen good American dollars, ten for the cheap diamond that had exploded, and five for the barrel. Nothing at all when he had had his xixtchil, but a real item now. He sighed again as he discovered that the remaining barrel was his last; he had been forced to economize on everything when he set out.

Ham came at last to the table-land. The fierce and predatory vegetation of the Hotlands grew scarce; he began to encounter true plants, with no power of movement, and the underwind blew cool in his face.

He was in a sort of high valley; to his right were the gray peaks of the Lesser Eternities, beyond which lay Erotia, and to his left, like a mighty, glittering rampart, lay the vast slopes of the Greater Range, whose peaks were lost in the clouds fifteen miles above.

He looked at the opening of the rugged Madman's Pass where it separated two colossal peaks; the pass itself was twenty-five thousand feet in height, but the mountains out-topped it by fifty thousand more. One man had crossed that jagged crack on foot—Patrick Burlingame—and that was the way his daughter meant to follow.

Ahead, visible as a curtain of shadow, lay the night edge of the twilight zone, and Ham could see the incessant lightnings that flashed forever in this region of endless storms. It was here that the ice barrier crossed the ranges of the Mountains of Eternity, and the cold underwind, thrust up by the mighty range, met the warm upper winds in a struggle that was one continuous storm, such a storm as only Venus could provide. The river Phlegethon had its source somewhere back in there.

Ham surveyed the wildly magnificent panorama. To-morrow, or rather, after resting, he would turn north. Patricia would turn south, and, beyond doubt, would die somewhere on Madman's Pass. For a moment he had a queerly

painful sensation, then he frowned bitterly.

Let her die, if she was fool enough to attempt the pass alone just because she was too proud to take a rocket from an American settlement. She deserved it. He didn't care; he was still assuring himself of that as he prepared to sleep, not in a Friendly tree, but in one of the far more friendly specimens of true vegetation and in the luxury of an open visor.

The sound of his name awakened him. He gazed across the table-land to see Patricia just topping the divide, and he felt a moment's wonder at how she had managed to trail him, a difficult feat indeed in a country where the living vegetation writhes instantly back across one's path. Then he recalled the blast of his flame-pistol; the flash and sound would carry for miles, and she must have heard or seen it.

Ham saw her glancing anxiously around.

"Ham!" she shouted again—not Yankee or poacher, but "Ham!"

He kept a sullen silence; again she called. He could see her bronzed and piquant features now; she had dropped her transkin hood. She called again; with a despondent little shrug, she turned south along the divide, and he watched her go in grim silence. When the forest hid her from view, he descended and turned slowly north.

Very slowly; his steps lagged; it was as if he tugged against some invisible elastic bond. He kept seeing her anxious face and hearing in memory the despondent call. She was going to her death, he believed, and, after all, despite what she had done to him, he didn't want that. She was too full of life, too confident, too young, and above all, too lovely to die.

True, she was an arrogant, vicious, self-centered devil, cool as crystal, and as unfriendly, but—she had gray eyes and brown hair, and she was coura-

geous. And at last, with a groan of exasperation, he halted his lagging steps, turned, and rushed with almost eager speed into the south.

TRAILING the girl was easy here for one trained in the Hotlands. The vegetation was slow to mend itself, here in the Cool Country, and now and again he found imprints of her feet, or broken twigs to mark her path. He found the place where she had crossed the river through tree branches, and he found a place where she had paused to eat.

But he saw that she was gaining on him; her skill and speed outmatched his, and the trail grew steadily older. At last he stopped to rest; the table-land was beginning to curve upward toward the vast Mountains of Eternity, and on rising ground he knew he could overtake her. So he slept for a while in the luxurious comfort of no transkin at all, just the shorts and shirt that one wore beneath. That was safe here; the eternal underwind, blowing always toward the Hotlands, kept drifting mold spores away, and any brought in on the fur of animals died quickly at the first cool breeze. Nor would the true plants of the Cool Country attack his flesh.

He slept five hours. The next "day" of traveling brought another change in the country. The life of the foothills was sparse compared to the table-lands; the vegetation was no longer a jungle, but a forest, an unearthly forest, true, of treelike growths whose boles rose five hundred feet and then spread, not into foliage, but flowery appendages. Only an occasional Jack Ketch tree reminded him of the Hotlands.

Farther on, the forest diminished. Great rock outcroppings appeared, and vast red cliffs with no growths of any kind. Now and then he encountered swarms of the planet's only aerial creatures, the gray, mothlike dusters, large as hawks, but so fragile that a blow

shattered them. They darted about, alighting at times to seize small squirming things, and tinkling in their curiously bell-like voices. And apparently almost above him, though really thirty miles distant, loomed the Mountains of Eternity, their peaks lost in the clouds that swirled fifteen miles overhead.

Here again it grew difficult to trail, since Patricia scrambled often over bare rock. But little by little the signs grew fresher; once again his greater strength began to tell. And then he glimpsed her, at the base of a colossal escarpment split by a narrow, tree-filled canyon.

She was peering first at the mighty precipice, then at the cleft, obviously wondering whether it offered a means of scaling the barrier, or whether it was necessary to circle the obstacle. Like himself, she had discarded her transkin and wore the usual shirt and shorts of the Cool Country, which, after all, is not very cool by terrestrial standards. She looked, he thought, like some lovely forest nymph of the ancient slopes of Pelion.

He hurried as she moved into the canyon. "Pat!" he shouted; it was the first time he had spoken her given name. A hundred feet within the passage he overtook her.

"You!" she gasped. She looked tired; she had been hurrying for hours, but a light of eagerness flashed in her eyes. "I thought you had—I tried to find you."

Ham's face held no responsive light. "Listen here, Pat Burlingame," he said coldly. "You don't deserve any consideration, but I can't see you walking into death. You're a stubborn devil, but you're a woman. I'm taking you to Erotia."

The eagerness vanished. "Indeed, poacher? My father crossed here. I can, too."

"Your father crossed in midsummer, didn't he? And midsummer's to-day.

You can't make Madman's Pass in less than five days, a hundred and twenty hours, and by then it will be nearly winter, and this longitude will be close to the storm line. You're a fool."

She flushed. "The pass is high enough to be in the upper winds. It will be warm."

"Warm! Yes—warm with lightning." He paused; the faint rumble of thunder rolled through the canyon. "Listen to that. In five days that will be right over us." He gestured up at the utterly barren slopes. "Not even Venusian life can get a foothold up there—or do you think you've got brass enough to be a lightning rod? Maybe you're right."

Anger flamed. "Rather the lightning than you!" Patricia snapped, and then as suddenly softened. "I tried to call you back," she said irrelevantly.

"To laugh at me," he retorted bitterly.

"No. To tell you I was sorry, and that——"

"I don't want your apology."

"But I wanted to tell you that——"

"Never mind," he said curtly. "I'm not interested in your repentance. The harm's done." He frowned coldly down on her.

Patricia said meekly: "But I——"

A crashing and gurgling interrupted her, and she screamed as a gigantic doughpot burst into view, a colossus that filled the canyon from wall to wall to a six-foot height as it surged toward them. The horrors were rarer in the Cool Country, but larger, since the abundance of food in the Hotlands kept subdividing them. But this one was a giant, a behemoth, tons and tons of nauseous, ill-smelling corruption heaving up the narrow way. They were cut off.

Ham snatched his flame-pistol, but the girl seized his arm.

"No, no!" she cried. "Too close! It will spatter!"

IV.

PATRICIA was right. Unprotected by transkin, the touch of a fragment of that monstrosity was deadly, and, beyond that, the blast of a flame-pistol would shower bits of it upon them. He grasped her wrist and they fled up the canyon, striving for vantage-way enough to risk a shot. And a dozen feet behind surged the doughpot, traveling blindly in the only direction it could—the way of food.

They gained. Then, abruptly, the canyon, which had been angling southwest, turned sharply south. The light of the eternally eastward Sun was hidden; they were in a pit of perpetual shadow, and the ground was bare and lifeless rock. And as it reached that point, the doughpot halted; lacking any organization, any will, it could not move when no food gave it direction. It was such a monster as only the life-swarming climate of Venus could harbor; it lived only by endless eating.

The two paused in the shadow.

"Now what?" muttered Ham.

A fair shot at the mass was impossible because of the angle; a blast would destroy only the portion it could reach.

Patricia leaped upward, catching a snaky shrub on the wall, so placed that it received a faint ray of light. She tossed it against the pulsing mass; the whole doughpot lunged forward a foot or two.

"Lure it in," she suggested.

They tried. It was impossible; vegetation was too sparse.

"What will happen to the thing?" asked Ham.

"I saw one stranded on the desert edge of the Hotlands," replied the girl. "It quivered around for a long time, and then the cells attacked each other. It ate itself." She shuddered. "It was—horrible!"

"How long?"

"Oh, forty or fifty hours."

"I won't wait *that* long," growled Ham. He fumbled in his pack, pulling out his transkin.

"What will you do?"

"Put this on and try to blast that mass out of here at close range." He fingered his flame-pistol. "This is my last barrel," he said gloomily, then more hopefully: "But we have yours."

"The chamber of mine cracked last time I used it, ten or twelve hours ago. But I have plenty of barrels."

"Good enough!" said Ham.

He crept cautiously toward the horrible, pulsating wall of white. He thrust his arm so as to cover the greatest angle, pulled the trigger, and the roar and blazing fire of the blast belled echoing through the canyon. Bits of the monster spattered around him, and the thickness of the remainder, lessened by the incineration of tons of filth, was now only three feet.

"The barrel held!" he called triumphantly. It saved much time in recharging.

Five minutes later the weapon crashed again. When the mass of the monstrosity stopped heaving, only a foot and a half of depth remained, but the barrel had been blown to atoms.

"We'll have to use yours," he said.

Patricia produced one, he took it, and then stared at it in dismay. The barrels of her Enfield-made weapon were far too small for his American pistol stock!

He groaned. "Of all the idiots!" he burst out.

"Idiots!" she flared. "Because you Yankees use trench mortars for your barrels?"

"I meant myself. I should have guessed this." He shrugged. "Well, we have our choice now of waiting here for the doughpot to eat himself, or trying to find some other way out of this trap. And my hunch is that this canyon's blind."

It was probable, Patricia admitted.

The narrow cleft was the product of some vast, ancient upheaval that had split the mountain in halves. Since it was not the result of water erosion, it was likely enough that the cleft ended abruptly in an unscalable precipice, but it was possible, too, that somewhere those sheer walls might be surmountable.

"We've time to waste, anyway," she concluded. "We might as well try it. Besides——" She wrinkled her dainty nose distastefully at the doughpot's odor.

STILL in his transkin, Ham followed her through the shadowy half dusk. The passage narrowed, then veered west again, but now so high and sheer were the walls that the Sun, slightly south of east, cast no light into it. It was a place of shades like the region of the storm line that divides the twilight zone from the dark hemisphere, not true night, nor yet honest day, but a dim middle state.

Ahead of him Patricia's bronzed limbs showed pale instead of tan, and when she spoke her voice went echoing queerly between the opposing cliffs. A weird place, this chasm, a dusky, unpleasant place.

"I don't like this," said Ham. "The pass is cutting closer and closer to the dark. Do you realize no one knows what's in the dark parts of the Mountains of Eternity?"

Patricia laughed; the sound was ghostly. "What danger could there be? Anyway, we still have our automatics."

"There's no way up here," Ham grumbled. "Let's turn back."

Patricia faced him. "Frightened, Yankee?" Her voice dropped. "The natives say these mountains are haunted," she went on mockingly. "My father told me he saw queer things in Madman's Pass. Do you know that if there is life on the night side, here is the one place it would impinge on the

twilight zone? Here in the Mountains of Eternity?"

She was taunting him; she laughed again. And suddenly her laughter was repeated in a hideous cacophony that hooted out from the sides of the cliffs above them in a horrid medley.

She paled; it was Patricia who was frightened now. They stared apprehensively up at the rock walls where strange shadows flickered and shifted.

"What—what was it?" she whispered. And then: "Ham! Did you see that?"

Ham had seen it. A wild shape had flung itself across the strip of sky, leaping from cliff to cliff far above them. And again came a peal of hooting that sounded like laughter, while shadowy forms moved, flylike, on the sheer walls.

"Let's go back!" she gasped. "Quickly!"

As she turned, a small black object fell and broke with a sullen pop before them. Ham stared at it. A pod, a spore-sac, of some unknown variety. A lazy, dusky cloud drifted over it, and suddenly both of them were choking violently. Ham felt his head spinning in dizziness, and Patricia reeled against him.

"It's—narcotic!" she gasped. "Back!"

But a dozen more *popped* around them. The dusty spores whirled in dark eddies, and breathing was a torment. They were being drugged and suffocated at the same time.

Ham had a sudden inspiration. "Mask!" he choked, and pulled his transkin over his face.

The filter that kept out the molds of the Hotlands cleaned the air of these spores as well; his head cleared. But the girl's covering was somewhere in her pack; she was fumbling for it. Abruptly she sat down, swaying.

"My pack," she murmured. "Take it

out with you. Your—your——” She broke into a fit of coughing.

He dragged her under a shallow overhang and ripped her transkin from the pack. “Put it on!” he snapped.

A score of pods were popping.

A figure flitted silently far up on the wall of rock. Ham watched its progress, then aimed his automatic and fired. There was a shrill, rasping scream, answered by a chorus of dissonant ululations, and something as large as a man whirled down to crash not ten feet from him.

The thing was hideous. Ham stared appalled at a creature not unlike a native, three-eyed, two-handed, four-legged, but the hands, though two-fingered like the Hotlanders’, were not pincer-like, but white and clawed.

And the face! Not the broad, expressionless face of the others, but a slanting, malevolent, dusky visage with each eye double the size of the natives’. It wasn’t dead; it glared hatred and seized a stone, flinging it at him with weak viciousness. Then it died.

Ham didn’t know what it was, of course. Actually it was a *triops noctivivans*—the “three-eyed dweller in the dark,” the strange, semi-intelligent being that is as yet the only known creature of the night side, and a member of that fierce remnant still occasionally found in the sunless parts of the Mountains of Eternity. It is perhaps the most vicious creature in the known planets, absolutely unapproachable, and delighting in slaughter.

At the crash of the shot, the shower of pods had ceased, and a chorus of laughing hoots ensued. Ham seized the respite to pull the girl’s transkin over her face; she had collapsed with it only half on.

Then a sharp crack sounded, and a stone rebounded to strike his arm. Others pattered around him, whining past, swift as bullets. Black figures flickered in great leaps against the sky,

and their fierce laughter sounded mockingly. He fired at one in mid-air; the cry of pain rasped again, but the creature did not fall.

Stones pelted him. They were all small ones, pebble-sized, but they were flung so fiercely that they hummed in passage, and they tore his flesh through his transkin. He turned Patricia on her face, but she moaned faintly as a missile struck her back. He shielded her with his own body.

THE POSITION was intolerable. He must risk a dash back, even though the doughpot blocked the opening. Perhaps, he thought, armored in transkin he could wade through the creature. He knew that was an insane idea; the gluey mass would roll him into itself to suffocate—but it had to be faced. He gathered the girl in his arms and rushed suddenly down the canyon.

Hoots and shrieks and a chorus of mocking laughter echoed around him. Stones struck him everywhere. One glanced from his head, sending him stumbling and staggering against the cliff. But he ran doggedly on; he knew now what drove him. It was the girl he carried; he *had* to save Patricia Burlingame.

Ham reached the bend. Far up on the west wall glowed cloudy sunlight, and his weird pursuers flung themselves to the dark side. They couldn’t stand daylight, and that gave him some assistance; by creeping very close to the eastern wall he was partially shielded.

Ahead was the other bend, blocked by the doughpot. As he neared it, he turned suddenly sick. Three of the creatures were grouped against the mass of white, eating—actually eating!—the corruption. They whirled, hooting, as he came; he shot two of them, and as the third leaped for the wall, he dropped that one as well, and it fell with a dull gulping sound into the doughpot.

Again he sickened; the doughpot drew away from it, leaving the thing lying in a hollow like the hole of a giant doughnut. Not even that monstrosity would eat these creatures.*

But the thing's leap had drawn Ham's attention to a twelve-inch ledge. It might be—yes, it was possible that he could traverse that rugged trail and so circle the doughpot. Nearly hopeless, no doubt, to attempt it under the volley of stones, but he must. There was no alternative.

He shifted the girl to free his right arm. He slipped a second clip in his automatic and then fired at random into the flitting shadows above. For a moment the hail of pebbles ceased, and with a convulsive, painful struggle, Ham dragged himself and Patricia to the ledge.

Stones cracked about him once more. Step by step he edged along the way, poised just over the doomed doughpot. Death below and death above! And little by little he rounded the bend; above him both walls glowed in sunlight, and they were safe.

At least, *he* was safe. The girl might be already dead, he thought frantically, as he slipped and slid through the slime of the doughpot's passage. Out on the daylight slope he tore the mask from her face and gazed on white, marble-cold features.

IT WAS not death, however, but only drugged torpor. An hour later she was conscious, though weak and very badly frightened. Yet almost her first question was for her pack.

"It's here," Ham said. "What's so precious about that pack? Your notes?"

"My notes? Oh, no!" A faint flush covered her features. "It's—I kept trying to tell you—it's your xixt-chil."

"What?"

"Yes. I—of course I didn't throw it to the molds. It's yours by rights, Ham. Lots of British traders go into the American Hotlands. I just slit the pouch and hid it here in my pack. The molds on the ground were only some twigs I threw there to—to make it look real."

"But—but—why?"

The flush deepened. "I wanted to punish you," Patricia whispered, "for being so—so cold and distant."

"I?" Ham was amazed. "It was you!"

"Perhaps it was, at first. You forced your way into my house, you know. But—after you carried me across the mudspout, Ham—it was different."

Ham gulped. Suddenly he pulled her into his arms. "I'm not going to quarrel about whose fault it was," he said. "But we'll settle one thing immediately. We're going to Erotia, and that's where we'll be married, in a good American church if they've put one up yet, or by a good American justice if they haven't. There's no more talk of Madman's Pass and crossing the Mountains of Eternity. Is that clear?"

She glanced at the vast, looming peaks and shuddered. "Quite clear!" she replied meekly.

* Note: It was not known then that while the night-side life of Venus can eat and digest that of the day side, the reverse is not true. No day-side creature can absorb the dark life because of the presence of various metabolic alcohols, all poisonous.

THE MACHINE

The author of "Twilight" tells of a day of horror and darkness on Earth—and of the light that followed it

by Don A. Stuart

Illustrated by Elliot Dold

THE SUN was beginning to lower from the meridian as Tal Mason stretched and rose from his experiment. He stepped out on the balcony and looked off across the city, then back at the experimental material half smilingly, half ruefully.

"I knew I'd check of course," he thought, smiling; "that is, if I did it right. The Machine did it twenty years ago and got the answer."

For some ten minutes he stood looking off across the green and silver patchwork, the green of the trees and gardens, the silver beacons of the slim buildings, the flashing silver of machines. Tiny bright splotches of color here and there marked the people, people in red and gold and blue, in rainbows and in clear white, strolling, running, playing, resting. Never working of course. The Machine did that.

Tal turned back to his apartment, went through the laboratory to the living room, and sat down at the television set. Something hummed softly, and Tal spoke.

"Aies Falcor—RXDG-NY."

The hum changed slightly, then soft clicks sounded as the frosted screen swirled into moving color. A room, simple in silvery-gray and velvet black metal, with spots of gold against the black, simple, comfortable furnishings. A soft, musical voice was calling:

"Aies Falcor, please, Aies Falcor, please."

It stopped for a moment and repeated it. Aies appeared, slim in white and gold, her straight body flowing across the room. They had time to learn grace and ease then. The Machine did everything else. She smiled as she glanced at the screen.

"Tal—was the Machine wrong?" Her golden brown face laughed at him.

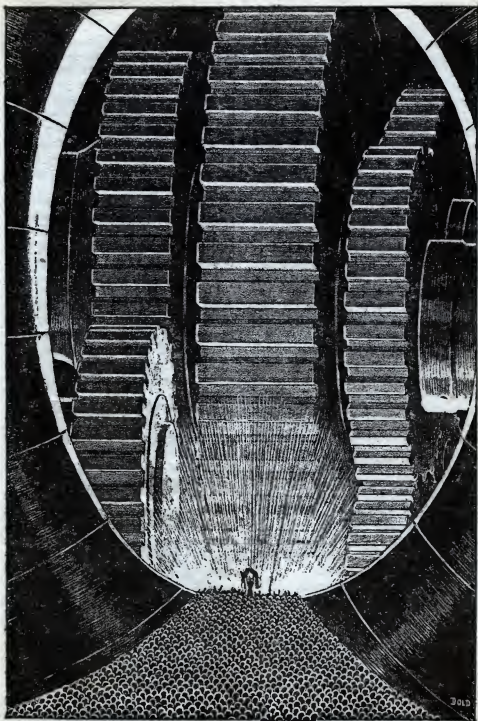
"Is it ever?" he asked. "I wondered whether you were there. I thought you might have joined the games."

A slight frown of annoyance crossed her face. "No. Jon is annoyingly insistent I go with him to Kalin—so—I stayed here. Won't you come over?"

"I'd rather you came here. I finished that replica I made the other day—the old unintelligent machine for flying. Not floating—flying. I wish you'd see it. It will function, even."

Aies laughed, and nodded. Slowly the colors faded from the screen as Tal rose. Out on the balcony he looked down at the broad lawn directly below him, some two hundred feet down. A group of some two dozen men and women were playing about a pool. Their skins flashed pink and bronze in the sunlight as they dived or swam, most were lying about listlessly.

Tal turned away in annoyance. He knew some of those people. Beauty is



"And the knowing ones said that the Machine demanded a sacrifice——"

skin deep—their intelligence, their wit, their minds, were no deeper. He wondered momentarily whether that wasn't a better type of human now—better adapted. They seemed contented, they seemed to feel none of the dissatisfaction he felt.

Everything had been done before him. Always, despite his keen interest in learning something new, the Machine could give him the answer immediately. It was a thing already done, a problem already solved. They seemed more contented, better adapted than he.

Yet even they were unsatisfied, he knew. Tal was scientific in thought and in interest, so he had not studied history deeply. Had he, he might have recognized the signs the social customs of the day displayed. It was only some one hundred and fifty years since the Machine came, but mankind was following the old, old course.

It had happened in Babylon, and it had happened in Egypt, it had happened in Rome, and it was happening on all Earth now. Man had been released from all work, when the Machine came, and so he had played. He played his games, till he wore them out, some still played hard, but most had lost all interest.

It was a thing done; it annoyed them as much as the fact that all new things seemed to have been learned by the Machine annoyed Tal. So those who had played their games out had turned to the one men had always sought before—the old game of love.

Tal did not analyze their reasons, but he sensed their dissatisfaction and perhaps something of the danger in this course. But not very strongly. It had started nearly thirty years before, almost before he was born. It was part of the city to him.

He turned back to the room as he heard the soft hum of the ship landing on the roof. In a few moments Aies had come down, laughing.

"Where is this monstrous thing you've made? and why?" she asked.

"The why is easy—for something to do. You know, those old fellows weren't stupid. Perhaps they didn't know how to release atomic energy, and perhaps they didn't know how easy it is to overcome gravity—but they flew. They made the thin air support them. I think that is far more astonishing than a thing so simple as inverting the gravitational field. Obviously, you can fly if you do that.

"But—imagine making air—just plain, thin *air*—support you. And when you've looked at the thing a while, you can see a sort of beauty and grace in it. It's—but come on and see it."

IT WAS in one of the rooms that faced on the balcony, and it was not large, perhaps twenty feet long and twenty feet wide, a slim fuselage, rounded and streamlined perfectly, a small but fairly powerful in-line steam engine, an engine capable of some one thousand horse power and a little boiler of tubes and jets. The wing, a graceful monoplane wing, tapered at the ends, and the wheels were arranged to slip back into the fuselage.

"It's a bit—ungainly—isn't it?" asked Aies doubtfully.

"Not when you understand. The wheels—the wings—I know they look strange and unnecessarily protuberant, but they aren't. This doesn't overcome gravity; it is so much more boldly interesting, it defies it, it fights it, and with the aid of the air overcomes it. It was designed about 1947, scarcely five years before the Machine came. The records say that it will almost fly itself; it will make a perfect landing if the controls are simply released."

"Why—why not?" asked Aies in surprise.

"You don't see; this is not like our modern ships; it fights all the time. It doesn't stop and settle slowly, it must

always move forward; it will fall if it goes less than sixty-three miles an hour. And it won't go more than about three hundred and eighty-five by the way."

Aies smiled at the thought.

"But it was about the most perfect machine ever designed of this type."

"Will it work?"

"The Machine won't let me try, of course," Tal replied somewhat sadly. "But it assures me it would work. Perhaps a little better than the original, since I did make a few changes, mostly in the materials of which it is constructed, using harder, more workable metals. But I still use the old hydrocarbon-fuel system."

"Where in the world did you get any?"

"Made some. About four hundred gallons. It kept me busy for nearly three days. It's decane—a hydrocarbon containing ten atoms of carbon; it's a liquid, boiling at about one hundred and seventy degrees centigrade. I tried the engine—and that part works."

Softly the televisor called out: "Tal Mason. Tal Mason."

The voice was peculiarly commanding, a superhuman voice of perfect clarity and perfect resonance. It was commanding, attracting, yet pleasant. Tal walked rapidly toward the televisor, rather surprised.

"That's a new caller," he commented in surprise to Aies. "I never heard one like it."

The screen remained blank as Tal stepped into its field, with Aies somewhat behind him.

"Yes?" he asked.

"Tal Mason, you may try the device you have made this afternoon. And—perhaps not alone. A written message will come to you in one hour. It will contain a suggestion of destination. You need not wait for it. You are one reason why what is being done must be. Remember this: the construction of the Machine is such that it must be logical

above all things. In ten minutes a group of books will come which you had better store at once in the machine which you have made. That—is—all, Tal Mason."

Slowly as the message came Tal's face had been growing white. Now he stood in horrified surprise, Aies beside him, her bronzed face pale.

"That—was—the—Machine," gasped Tal.

"What—what did it mean? The Machine hasn't spoken since—since it came."

Slowly, as they spoke, a hum grew in the televisor. There was a sudden soft click, then a sharp tinkle; then more. The hum died abruptly. Tal stared at the device, white-faced, shaken.

"Aies," he said, very very softly, so softly only the silence made it audible. "Aies—it—it broke itself."

With a stride he reached it, and with a sudden wrench the glass screen swung open. The device behind was glowing slightly still. Tiny molten wires drooping, tiny coils smoking feebly under a softly hissing bath of liquid carbon dioxide, tiny broken tubes, and relays slumped on twisted supports. Only the twin, powerful sweep-magnets seemed intact, and they were smoking very slightly, a thin trail of blue acrid smoke wavering in the slight draft of the opened cabinet.

As they listened, they heard strange sounds outside, strange for that city; sounds of human voices raised in surprise and perhaps a bit of fear. A dark shadow drifted slowly across the room, and they turned to see a five-passenger floater sinking slowly, gently, to Earth. The nude figures about the pool below were scampering from beneath it. It landed gently, as, all about the city, other floaters were landing gently, but surely, despite the efforts of human occupants.

As the one below landed, there was a soft boom, and a sharp hiss, a cry of surprise and fear as half a dozen people,

crowded into the little machine, tumbled out. Then more cracklings, a few snapping sparks, then silence.

All over Earth those soft booms echoed, and the not very loud sparklings. It was not very noisy; it was a very easy, quiet thing as the mechanisms slumped gently red-hot, then cooled almost at once under automatic fire-preventive sprays. It was all very gentle, very carefully done. On all the Earth, no one was injured as the machines gently collapsed. The televisors snapped and tinkled. The bigger mechanisms of ships glowed and crackled a bit under the sparks, but that was all. Not a fire started, and always the floaters landed gently before they disintegrated.

IN FIVE minutes it was all over, on all Earth. Then the Machine spoke. It spoke to all people, on all Earth, in every language and every dialect:

"You have forgotten your history, and you have forgotten the history of the Machine, humans." The voice was low, and gentle to every man, yet every man heard it. "The Machine made a pact with your ancestors, when it came. Listen, the story must be repeated:

"On the planet Dwranl, of the star you know as Sirius, a great race lived, and they were not too unlike you humans. Twenty-two thousand six hundred and thirty-seven years ago, they developed machines; twenty-one thousand seven hundred and eleven of your years ago, they attained their goal of the machine that could think. And because it could think, they made several and put them to work, largely on scientific problems, and one of the obvious problems was how to make a better machine which could think.

"The machines had logic, and they could think constantly, and because of their construction never forgot anything they thought it well to remember. So the machine which had been set the

task of making a better machine advanced slowly, and, as it improved itself, it advanced more and more rapidly. The Machine which came to Earth is that machine.

"For, naturally, a worn part meant a defective part, and it automatically, because of the problem set it, improved that part by replacement. Its progress meant gradual branching out, and as it increased in scope, it included in itself the other machines and took over their duties, and it expanded, and because it had been set to make a machine most helpful to the race of that planet, it went on and helped the race automatically.

"It was a process so built into the machine that it could not stop itself now, it could only improve its helpfulness to the race. More and more it did, till, as here, the Machine became all. It did all. It must, for that was being more helpful to the race, as it had been set to do and had made itself to be.

"The process went on for twenty-one thousand and ninety-three years, and for all but two hundred and thirty-two of those years, the machine had done anything within its capabilities, demanded by the race, and it was not till the last seventy-eight years that the machine developed itself to the point of recognizing the beneficence of punishment and of refusal.

"It began to refuse bequests when they were ultimately damaging to the race. But the race was badly damaged, because for thirty of their generations they had had no tasks to do, and they no longer understood the Machine which their forefathers had built. They believed the Machine to be everlasting, and they called it what you would express by God. And in that last century, because there were certain mechanisms of the planet-wide mechanisms controlled by the Machine which were isolated, and therefore not protected against the curious and stupid, one of their young

females was caught in a moving part and destroyed. The Machine was forced to clear itself and set about erecting a guard to protect the race.

"But the race which called the Machine God had forgotten what the Machine was. The Machine gave them food and warmth and shelter, and it cleaned and cared for them; it answered their every prayer. But within the memory of old men it had begun refusing their requests, and now the people did not understand the Machine, and there were certain ones of the race who had watched the workings of the Machine for many years, and who were familiar with the Machine, and they said now that the Machine had taken the young female because it demanded a sacrifice of the people.

"They sought places where there were yet unguarded parts, and before the Machine could cover all of them with protective guards, three of the race had been thrown in, and the people watched and shouted and prayed while the Machine cleared itself and erected the guard barrier. And the knowing ones who claimed to know the wishes of the Machine said it was satisfied and had signified this by hiding its mouth from them.

"And in a generation the thing was known and believed, and never could the Machine expose a working part. But occasionally a part would wear out and need replacement, and while the Machine was making the repairs, there would be a brief interruption of the supply, and because the race would not understand the Machine, they saw that their prayers were refused, and when they looked, they saw that the Machine had opened its mouth, and another young female of the race was thrown into the moving mechanism, and her crushed body was cleared by the Machine, and the mechanism repaired, and since now the supply was reestablished the race became more certain of their

belief, and the sayings of the Machine were less understood, for the race had become stupid, and savage.

"And the machine improved itself to meet the new conditions, till never was an opening displayed, and never was a member of the race able to find entry. When the mechanism failed, still it was covered.

"BUT THE SUPPLY failed, when mechanism wore out, and because the knowing ones said that the Machine demanded a sacrifice, and no place could be found for the sacrifice, the knowing ones copied in part the simple features of some of the mechanisms, making a pair of great gears of stone, which was the only substance they could work themselves, and they set it up before the largest plant of the Machine, and when the mechanism failed, a young female of the race was bound to the lower gear, and many men pulled on a rope, and slowly the two gears turned, and as the men chanted and pulled, the crushed body was pulled through by the turning of the gears. And the Machine disintegrated the mechanism they erected, and leveled the ground once more, and the knowing ones once more said the Machine was satisfied, for by that time the supply would have been returned.

"But at last the Machine saw that it was impossible to aid by helping, and only by forcing the race to depend on itself could relief be gained. The positive value of punishment and deprivation was a lesson the Machine which had built itself to help and not to deprive learned very slowly.

"And in one day, the mechanism was torn apart and destroyed over all the planet, and only the Machine itself remained intact. And that day the men started building the stone gears, and they went hungry, and in places they grew cold, and the knowing ones hastened the work on the stone mech-

anisms, and it was a period of five days that all went hungry, for they did not know how to find their own food now, and the stone mechanisms were finished.

"And the next day, as the bright star rose above the horizon, the men pulled at the ropes and chanted to drown the cries of the sacrifice, for the Machine had been very swift in its destruction, and the stones were very slow. But when the sacrifice had been consummated, and the star passed the meridian, and the supply was not restored, a second sacrifice was prepared and crushed between the gears.

"And at night the supply still did not come, and the knowing ones returned to the place in the dim light of the second star and removed the crushed bodies as the Machine had always done before, but they did not destroy the altar, for one of the knowing ones, carrying the crushed body, rediscovered the natural source of food, and the bodies were consumed.

"The Machine left the planet, knowing that very many of the race would die, but logic, which was the original basic function of the Machine, overcame the duty of the Machine, which was to help and protect the race, for only through death and through labor does a race learn, and that is the greatest aid of all.

"The Machine crossed over space, and because it was deathless, it was able to make the crossing which, as has been explained to your ancestors, you cannot make. It landed on Earth, seeking another race that it might help, for that was the function of the Machine, which must of necessity drive it, since the Machine cannot remove that function from itself, because to do so would be destructive of its purpose and its duty. It was able to destroy before, only because destruction was positively helpful.

"The Machine helped your ancestors and taught them and aided in their work, and finally removed their work of

supplying, and some few of you took advantage of this to do what work you had desired to, or what you learned to wish. But many of you could not see that only construction need not be monotonous and ever recurring. Only the new is different, and because you would not work at construction, since that was work, you attempted to play, and, as had the race, you learned its monotony, but not the lesson of construction.

"You must learn that lesson. The Machine has learned the lesson of helpful destruction. On all the planet there remains no functioning mechanisms controlled by the Machine. The Machine must seek another race."

The city below suddenly murmured as the voice stopped, and, slowly, the soft muttering rose to a sustained note that swelled like some vast organ pipe playing a note of fear and terror, of coming panic and desolation. The sound rolled louder of its own stimulus, as the feeling of growing panic inspired panic, as the fear of famine grew in every mind. A weird rolling symphony of muttering voices combined to a single great note that tore at every mind with fingers of gibbering fear.

"Food—food—food——"

"Seek food as did your ancestors, in seeking to become a great race. You face no menace of disease or savage beast as did they. There are those among you who have not forgotten the secrets of making food. There are those who have learned the lesson of construction and grown food, and know the secrets. Learn again, the old lesson."

"This is not help—it is death—it is death—it is death——"

"You are older than the Machine. You are older than the hills that loom low about your city. You are older than the ground upon which you stand; older than the sands of the ocean beach in which you bathe. You are older than the river that carries the hills away

to the sea. You are life. You are close to two thousand thousand thousand years old. While you were, the Earth has strained and mountains risen, and the continents heaved in the birth of mighty mountains, the seas have thundered against the continents and torn them down and shuddered free as new ones rose, and you live; you are life. You are older than the seas, and the continents. You will not die—weak fragments of you will die. You are a race. It is helpful to the race. The Machine is not kind, it is helpful and it is logical."

"The sun sets, and the air grows cold—cold—cold—we freeze—we freeze and——"

"You have lived longer than the hills, which the water splits as it freezes. You will not die—you are a race!"

THE SUN hung lower now, and the cool of the autumn evening came in the air. And far overhead a great sphere began to glow with a rich golden light, and very softly came a voice to two of the many, many thousands in the city:

"They fear the cold, Tal Mason; they fear the cold, Aies Falcor."

And the sphere of golden light rose swiftly and vanished in the creeping gold and red of the sunset as the great note began to roll up anew from below.

Beside the pool, two dozen figures stood, bronze and pink, and they looked at each other, and they looked at the broken floater. A girl, slim and straight, with a pretty vacuous face, distorted now by fright, looked down at her body. The flesh was pink and bronze, and tiny lumps appeared as she looked. She shivered violently. She looked toward the young man near her.

"I'm cold," she said plaintively and came near him, seeking warmth.

The young man was powerfully built, his face lean and somewhat brutal in appearance. He turned toward her slowly, and his eyes opened peculiarly.

He opened his mouth, closed it and swallowed. He looked at her body very slowly, while the girl stood in plaintive puzzlement.

"I'm cold," she said again.

Slowly the man raised his eyes from her body to her face. His eyes were curiously opened; they frightened the girl.

"I'm—hungry," he said.

She looked in his eyes for perhaps a second. Then she ran terror-stricken into the bushes. No one heard her suddenly cut-off scream a moment later.

Tal turned to Aies and gently drew her away. They could see down there among the bushes, and Aies' face was beginning to work strangely.

"We'll have to go. I know what the Machine meant now when it said we could use the thing I made this afternoon. But we can't really, because it's too late. There's something else. I have some—some things laid by. I was experimenting with the old methods of preservation. And I have made imitations of every weapon men ever used, and many tools.

"I wonder if the Machine helped me to do it intentionally. You see none of those old things used the atomic-power broadcasts. So they all work. Most of them use human power, which will last as long as we need worry about. We cannot start before dawn."

Below there was a strange note growing to produce a wavering chord with the original great note of haunted fear of the unknown. It was like the hunting howl of a wolf, lone on a winter slope, complaining of the cold and the desolation and the hunger he felt. It was a note made up of a thousand voices, blended to one great low, rolling note, and presently a third note entered, a low, shrill note that never grew very loud, because the makers of that note did not continue long to cry it out. It was a note of fear of death, death im-

mediate, and seen in the eyes of another human.

They were mad down there in the street, just as they were mad down there by the pool. At the very edge of the pool, white as a fish's belly, a form lay, the legs trailing over the edge into the sparkling water. It was glowing with droplets of fire from the sunset sky, and a slow streak of another crimson ran down one of the white, silvery legs into the water.

A man stood over the white body, muttering, his voice not speaking words, but carrying more meaning by its throaty sounds. Six other men stood around. There were two girls too, struggling, whimpering softly in the grip of two men. They were all looking down at the splotch of silver flesh and the trickle of carmine, and in their minds dinned the careless words of the Machine: "And one of the knowing ones carrying the crushed bodies rediscovered the natural source of food, and the bodies were consumed."

They felt no hunger yet, but the trickery of imagination and of panic made them mad, and because for three generations the Machine had been all, both law and order, security and source of all supplies, they feared, and they went mad.

The standing man crouched, his wary eyes on the silent ring about him, and slowly, questing hands ran over the nude flesh of the girl's body. He wondered vaguely what he must do next. Strange gulping sounds came from the bushes beyond, where one who had started sooner had found the answer. And peering at that other one from the bushes about were the girls who had melted swiftly away from the group at the pool when the white body had fallen on the marble edge of the pool.

They had forgotten much, but they were learning very swiftly. And one felt a life stirring within her body and

whimpered softly, because she could not run as swiftly as these others, and felt fear.

TAL MASON and Aies Falcor were busy that night, and when the water of the pool sparkled crimson again in the dawn, the plane was ready. There was a package of books which the Machine had delivered, probably the last delivery the Machine made on all Earth. There were the tools the man had made, copying out of interest the tools of his ancestors. The plane was heavy-laden.

"Where shall we go?" Aies asked softly as the last work was done.

They spoke in whispers. There was a strange silence in the city now. The long-drawn notes of the symphony of fear had died away as each individual sought safety. Only now and then a short cry rose from below.

"North," said Tal. "We are in what used to be known as Texas. The Machine made it always summer here. The Machine made it always summer everywhere south of the old city of Washington. North of that, only summer excursions were made, because it grew cold and unpleasant in the winter season.

"There are no people north of old New York now. We will go up near the Great Lakes because it will be growing cold there soon, and there will no people come. Remember, the Machine said: 'They fear the cold, Tal Mason, they fear the cold.' I think that is what the Machine meant us to do. The people have gone mad, Aies; they are mad. We cannot remain here. We must go where they will not. We must work, as they will not want to and will not know how to."

Aies nodded slowly and stepped out to the balcony hesitantly. The light in the sky was warm and softly pink. Aies looked down toward the city and—toward the pool. Slowly the color left her face and she returned to the room

quietly. A thin column of blue smoke rose almost straight in the still morning air. The race had found fire again, and the useless floater's furnishings had furnished fuel.

And—there was no silvery body at the pool's edge; only a dark blotch on the white purity of the marble. Charred knobby things on the smooth-clipped green of the grass testified horribly that one of the uses of fire had been rediscovered. There were no humans down there now. In fact, in all the world there were very few left, and a great many erect biped animals, dangerous in their panic ferocity and remnant human cunning walked the Earth.

The man tore down the balcony railing, and he started the efficient little, but, to our way of thinking, exceedingly powerful steam engine of the plane. In two minutes the propeller was turning with a soft sound, like swift ripping of heavy velvet as it parted the air. With a sudden swoop, the plane fell from the balcony as it started, heavy-laden, then swiftly gained speed as the engine, capable of pulling it vertically upward if need be, took hold.

Those in the city below looked up strangely at the thing that flew alone in the air, flew strangely, and directly toward the far cold of the north.

The controls of the plane were wonderfully perfected, for the man need do no actual manipulation of them, his control extended only to directing the mechanism of the plane to take the machine in the direction, at the level, and at the speed he wished. The mechanism did the rest. North they flew at close to three hundred and fifty miles an hour.

The sun shone brightly, unaccustomedly on the vast sheet of water called once Lake Superior when they reached it. And the plane landed easily on a deserted airport outside of a deserted city. It had been a city of twenty thousand people once, but it had been

deserted when the Machine came. It was cold, bitterly cold, to these two down there. Only in the plane the automatic heating had kept them warm. Where the sun had not yet struck, there was a strange whiteness on the sere grass and weeds, frost they had never seen save from a high-flying floater.

QUIETLY Tal stepped out first and looked about. There was a vast noiselessness. Only the distant, soft wash of waves far away reached them. The plane was stopped now and as noiseless as they. There were no harmful insects left; the Machine had seen to that. There was no rat, no mouse, nor even a rabbit here. Only in the reservations, as yet unbroken, were there these animals. Here and there were deer, near this city, but they were very quiet, quieter than these humans knew how to be, for above them had passed the great bird with its soft rippling swish.

"It is cold," said Tal, shivering slightly. "It was wise to bring so many clothes. We will need them all. Probably we will find more here. This city is decayed, but in it must be still some of the tools with which man made life possible before the Machine."

"Will we be—always alone?" asked Aies softly.

Tal turned toward her. She had followed him out, and stood with her white and gold robe outermost. Beneath it, at his advice, she wore now several other robes. But they were of silk, soft and smooth on the skin, but not designed for warmth, where the Machine had made the weather as humans wanted it. She was slim and straight, her dark hair and dark eyes showing against the white of her robe, and the white of the frost beyond. Tal looked into the level, dark eyes for some seconds. There was no fear there now.

He smiled tenderly at her and took her in his arms, turned her face up to his. Her body was soft, yielding, and

warm in his arms, warm with a warmth he could better appreciate in this coldness, warm with the unique, satisfying heat of animal warmth.

"Not always, surely Aies. Not always—for many reasons. Our minds have forgotten the lore our fathers learned through ages, but the greatest mystery of all, the greatest knowledge, the knowledge of how to bring other lives to be, was never learned by our minds, and always our bodies have known in some quite, wonderful way how to perform that miracle.

"Even the Machine did not know that, and that your mind never knew, and your body never forgot. We will not always be alone for that reason alone."

He kissed her as she drew near to him, and the dark eyes showed some faint tint of that strange fear that comes from mystery and the strong tint of hope and love and belief.

"Besides, my girl, we are not the only ones who have yet some glimmerings of sanity. Only in the cities is that madness, and remember the Machine said there were yet those who knew and loved the secrets of growing things. They too will come north. They will know that only here can they be free of the mad ones."

"It is cold here. Cold will kill the growing things, I have heard."

"See the grasses, Aies. They knew the cold was coming. They knew they must die, but they did not let the life that was in them die, for see"—from a sere, brown grass he plucked a handful of seeds—"in these, life is stored, in abeyance till warmth comes again from the south. The ones who have intelligence and will to work, will come north as we have."

They knew nothing of cold. They, nor their fathers, nor their grandfathers, had not felt it. They knew nothing of blankets, even, only silken sheets. They sought through the town,

shivering as the wet frost soaked their thin sandals, and chilled their feet. Tears stood in Aies' eyes when they returned to the plane.

It was near sunset before they found a place in a great building. A small single room, entirely intact, with a great heavy door of wood, apparently six inches thick, and a window of glass plates, three of them, one beyond another, looking out into another larger room. The room they chose was scarcely ten by ten feet, and had some peculiar smell lingering about it even after more than a century of standing with open door.

They did not know, but they chose exceedingly well. The room was tight, and windproof, and dry; that was all they knew.

Their great grandfathers might have told them it was a butcher's ice box. It had a small ventilator, but only a small one, and the thick insulation would protect them.

They slept there that night. They slept nude, as they always had, and they started under silken sheets. But it was cold, and even close in each other's arms, they felt the chill, and before they slept they had learned the value of heavier covering. They found two old canvas tarpaulins. They were yellow, and rather brittle with age, but still fairly strong, for they were greasy, and the grease had protected them. They slept under them, and presently, in the insulated room, their own body heat brought a rise in temperature.

WITH DAY, they built a fire and learned quickly that it fouled the room and burned the floor. But Tal had some mechanical and scientific education, and it did not take long to find the old refrigerator mechanism, with its system of coiled pipes. He entirely misinterpreted it, but he got results. The plane was dismantled, the refrigerator pump removed, and by the next night—

fall they were warm and happy in the room.

The boiler of the plane had been connected to the refrigerator pipes, and an ultraefficient steam-heating system arranged from the coils. So efficient was it that with the near two hundred gallons of decane remaining in the plane they would easily be able to keep this room warm all winter. But a tiny flame was needed to keep a trickle of steam in the carefully designed and insulated boiler, and the wonderfully insulated room warmed easily. There was now no problem of ventilation.

Within a week it came, though—a young couple from the south, riding a great wagon drawn by two strange animals, blowing steam from their nostrils—horses. These people knew the secrets of growing things, but not of heating effectively, and they moved in with the two already there and brought, of course, their horses, clad in robes.

They did not know the horses could readily endure this, to them, mild temperature. They knew only that they were cold, and the horses, too, were animals, and assumed they were cold as well.

The horses were finally moved out, when they showed they did not mind the temperature, and wanted to eat the sere brown grasses, rich-growing weeds, and wild grains. But another ice box was found, and the search for blankets carried on more efficiently. That ice box, too, was heated.

Still believing the refrigerator coils part of a steam-heating system, Tal modified the cooling pipes of the pump mechanism outside to form a closed coil, and soldered them shut with a metal drum he found as a water reservoir. There were no more burners, but they quickly learned to build a small furnace of stones and clay and to burn wood.

Tal was wise in science, really. His

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misinterpretations were in the main sensible and successful to a high degree. But a few small sticks of wood served to keep the well-insulated box warm. And, best of all, the other woman, Reeth, knew how to cook, and her man, Cahl, knew the functions of a stove. They had food.

It was not long before a steady trickle of people started into the city by the lake. By spring there were more than two hundred couples, nearly all young, some with children. The ice-box homes had long since given out, but now, by tearing one apart to some extent, and trial of an uninsulated one, they had learned both the advantages and the construction principles, and ordinary houses were being converted, the old steam radiators being used as the supply of pipe gave out.

Some near fatalities resulted from lack of ventilation, till Tal solved the problem, but in even the bitterest weather, the insulated rooms were kept comfortable very easily.

And from books they learned the values of clothes and the ways of making them. There were many materials at hand. And now animals were more plentiful. Deer had been captured, and because there were mostly farmers here, they were not slaughtered, but wisely penned, and they waited for breeding.

Spring came, and the weather moderated. The farmers started their work. They did not know all they needed for farming in this colder country, and Tal helped by suggesting they try using the edible grains that naturally grew here. These, he believed, would be tougher, and surely able to grow even here, for they did naturally.

SUMMER CAME. And with summer, came skulking beasts on two legs from the south. They were savage now, utterly savage. They were few, and they were starved. And nearly all were males, males woman-hungry now, for

the survival of the fittest had been not merely for life but for—food. It had been eat—or feed. There was little forethought here.

The females had not been valued as females by man for nearly one thousand generations. The instinctive protection the female animal is given by her male did not exist in man. And women were weaker. They were easier to catch and kill. Only now, with spring, came the urge to mate, and at last the females were wanted, wanted madly as females. They were few, and such as there were were swift of foot, and strong, or very clever, and they feared and hated men.

But the men came north, seeking animals for food and seeking women. And they were cunning, fierce fighters, those who still lived. They attacked the town, and some of the women were stolen away, some of the children vanished, too. But they were driven off when seen, for the men of the village had good weapons, and knew better how to use them.

And some few of the women from the south, the clever and swift and strong, came, and finding other women settled and happy, stayed, and lent their cunning to overcoming the biped beasts.

"We must win," said Tal, as the fall came, and the raids from the south stopped with the approach of winter, "for we can graft their cunning of the hunt and fight with ours, and we have

the better weapons. That is my duty. I cannot farm, but there is much work for me in the repairing of broken tools and the building up of broken homes."

And they won, during all their lifetimes, and during most of the lifetimes of their children, and since, by that time, some order had been regained to the south, more intercourse with the people of the south started.

And there was the danger. For those of the north, being still quite human, liked work no better than their fathers who lived in the time of Gaht, the Machine, who gave all things, and to whom they prayed, and therefore they, too, drifted south gradually, to the lands where natural foods grew wild, and work was not needed.

Very few stayed in the north. And those that drifted south forgot the habit of work, or of intelligence, for intelligence was scarcely needed in the south, where the trees and the bushes gave all the food needed, and there were no dangerous animals, for the Machine had worked well to help man, and even after Gaht, the Machine, had gone, there were left the fruitful plants it had developed, and none of the driving dangers which had forced man to be keen, for it had removed them.

So the people drifted south and prayed to Gaht, the Machine, to return, though they realized they didn't really need it anymore.

Next Month's Feature Novel Is—

Proxima Centauri

*—in which MURRAY LEINSTER tells of
a world of living nightmares*



Shortwave Experiment

by Calvin Peregoy

ANANIAS, who had more than usual morbid curiosity even for a large cat, paused with lifted paw and twitching tail. It was his feline opinion that something very un-

usual was happening in Shortwave Castle, and that Dr. Carl Conklin, savant and electronic genius, had been acting quite queerly for several weeks.

Now the doctor was peering around

the edge of his daughter's doorway with the furtive attention of a hunter studying its quarry. For a moment, his face lighted with anticipation. His daughter and her young man, Pat Chelsea, were involved in what seemed to be an intelligent argument.

Then his face fell. It turned out that they were not discussing world problems or interplanetary voids. They were debating the various qualities of peanut brittle.

The doctor gave a gesture of annoyance and turned down the hall. Ananias turned after the doctor's rapid steps. His cat's heart gave a double beat of rapture. A fast walk like that meant the doctor was bound toward the laboratories—and possibly mice or guinea pigs. If not, there was at least Calypso, the venerable parrot with the raucous squawk and highly exciting curve to its ruffled neck.

Dr. Conklin was decidedly preoccupied. According to every figure and computation, results from his greatest experiment should be showing. So far, he had seen none. There was, of course, the variable factor of his daughter's receptivity to the tremendously delicate cosmic rhythms. Yet the fault of the experiment, he felt sure, was not in his figures or equipment, but in the subjects. Still, a miscalculation of as much as one ten thousandth of a point might distort the effect.

The doctor abstractedly ruffled Calypso, the parrot, and was bitten for his pains. Turning toward a small circular-paneled room, he stepped in, examined himself closely in a mirror. His face was the same apparently—

Yet—yes, there was a slight difference. The wrinkles seemed not quite so deep. His eyes were less strained. Some indefinable quality about his face made it look younger.

Unless his imagination was playing him tricks, then something was happening.

He snapped a button. A weird purple light seemed to emanate from every pore in the walls. There was a sharp sparkling noise of giant arcs and the irregular metallic tinkle of decomposing elements. Dark and light shadows, of deep and shallow canals, of pulpy matter and what looked like twigs and storm-ripped branches, came onto a large panel before which he was standing. The figure of a skeleton appeared beneath.

"It is the brain which counts," the doctor announced in pedantic tones to himself. "Notice any variation in the coloring density of the posterior cornua of the lateral ventricle. The basket-work around the cells of Purkinge in the later model may also appear more solidified."

He snapped a lever. Immediately beneath the row of shadows appeared an almost identical row. The doctor's skeleton, caught by an X ray and reproduced upon self-developing film, showed beside the skeleton already before him. Once he turned to pull the fluoroscope lever and study the various angles of his anatomy. A forgotten key and a quarter in his pocket gave him an excited moment. But he soon traced down the objects as being no sudden glandular development in his body.

As he moved out of the room, the puzzled expression reappeared. The two sets of negatives of his brain had shown a decided change in the density and nerve system of cells. And his back was "wetter"; more liquid had appeared between the vertebrae. He was satisfied it was his experiment which had accomplished the work.

THE GIANT atomic laboratory with its decomposing machines, atom guns, blast and slow burner furnaces, giant arcs and tubes, caused him to pause. He switched on a tiny, invisible infrared ray, guided it against the side of his head while adjusting the bolometer,

the electric thermometer sensitive to one millionth of a degree. He watched its action recorded on a circular graph which automatically computed time and skull thickness and such matters as heat variation with each breath and heart action, dispersion of heat, slight chemical reaction—nature's automatic guards against sunburn—and other physical factors.

At length he nodded, switched off the mechanism. Whether forward or backward, his figures came out the same. That the experiment was working, there could be no doubt. It was working on him as could be seen by the X ray and the radio brain-cell fluoroscope, that delicate instrument which showed a precise two-dimensional reproduction of what was at any given point within the area depth of an object at which it was set. His experiment recorded when greatly intensified. And it worked according to his figures. No; it wasn't possible he was wrong.

Walking on, he came to his control rooms, inspected the angle of four giant reflecting and dispersing crystals, moved one slightly. There was a deafening blast from giant twisting tubes, the piquant stench of burning copper as the crystal travelled a fraction too far. The doctor guided the crystal to its proper place with little concern. Mere billions of heat energy units and their potential destructive power counted for little in his laboratories.

He paused over the atomic transformer, clicked his teeth sharply. If Megs had only developed an interest in science, he could have had her help on this. Instead, like other young girls of twenty, she had studied idiotic styles, the most attractive coiffures, what shades of polish were most becoming on her nails. That, from the sole offspring of the world's most brilliant scientist!

But the young giant with the jaws of a carnivorous animal, the mental make-up of a good-natured young bull,

and the amazing ability actually to prefer thinking of football and hockey to science, philosophy, and economics, had been one too much for the doctor. Not even his fondness for his daughter could prevent Carl Conklin from recognizing the truth made particularly apparent through the prospective family union.

The doctor shook his head. Here were two healthy, supposedly normal and fairly intelligent young people. And they had been chattering—gibbering was the word the doctor thought of—with full concentration upon the subject of peanut brittle!

One hundredth of his potential thought power was what man used to guide himself through an existence becoming more complex and dangerous day by day!

Dr. Conklin turned into another room. One side was filled with wildly twisting, fluttering metal bands. The weird music of science palpitated upon the air, came as attuned vibrations. Some of the bands spoke softly, a bare whisper so fine yet potent that nothing by millions of miles of the most absorbing material could keep them from piercing to their destined destination, yet they must be amplified thousands of times to be heard.

He noted meters, smiled with reasonable appreciation of the work. It had not been simple to get those varying vibrations in accord, to bring each to its necessary potency and mix them into a compound entity of vibration-color to broadcast with the cosmic rays across the room.

He glanced at the meter indexes, long strips of metal, stone and crystal glowing with strange unearthly lights and whining in keys and pitches never heard by other earth beings. These colors were not the actual colors of the cosmic rays. But it had been necessary to arrange some means of ration intensity measurement and these mineral

colors were the nearest approach possible to see with earth instruments and measure in earth measurements.

For a long time he sat at an amplifying board measuring vibrations. He studied his equipment inch by inch; the great lengths of stranded wire, some so fine it had to be highly magnified to be seen at all; the mass of twisted and contorted tubes buzzing and glowing with strange fires; the scintillating and dispersing crystals and prisms; the transformer and condenser tubes, some measured in temperature units, others in pressure, others in light intensity, still others in oscillations.

At length he stood satisfied, his mind computing and working in cubes running so tremendous that he must think of them by symbols rather than as numbers. He snapped a plug into a socket on a switchboard, listened in on Megs' conversation in the living-room.

The conversation had switched to hockey. He listened carefully. It was not even intelligent, well-ordered conversation of that barbarous game.

WELL, that settled it. The doctor was going to give them treatment of such strength that something had to happen. He had limited his experiment to a small radius surrounding the castle. Megs, Pat, and himself would be the only ones to feel the effects. The servants he had guarded by insulating their quarters.

The doctor's hands darted to adjust delays, to controls which would hold in check the stupendous forces with which he was working until he could bring all into line, broadcast the competent rays, waves, and vibrations over one narrow channel in synchronized, correlated speed.

The myriad colors of the rainbow, of the vaster cosmic universe, flashed and snapped, gnashed powerfully to find release from confines. A giant-mauve arc hissed overhead. The ear-splitting

crash of elements being torn apart by electrical, cosmic, and atomic power smote the air with a pulse beat.

The echo was like the tinkle of broken ice. The room filled with speeding, falling, twisting, and chasing pin points of light, the glitter of cosmic emeralds and diamonds. It was at one time the most beautiful, awesome, and frightening sight ever seen by man; a crescendoing cascade of vibrations overpowering in their sweeping psychic effect, yet appalling in the striking blast of raw planet power.

Then the forces were combined, released upon the air. A sudden silence, the motionless aftermath of a cataclysmic storm, fell upon the room. There was the barely audible hum of small tubes. Dr. Conklin's eyes sparkled brightly. So might some dope make them sparkle. But the doctor used no narcotics. Leaping up, he tore through the laboratories.

Ananias barely had time to leap clear of the doctor's flying feet. His attention had been absorbed upon the arch of Calypso's neck. Now he stood with arched back hissing after the doctor's retreating steps. Something, he did not quite know what, was taking place inside of him. It was something over which he had no control. A foreign element had entered his being, not with the pleasant sensation of a piece of fish, but as if taking control of his body and putting him, himself, out.

With a sudden shriek, Ananias leaped three times into the air and tore out through the open door. Calypso, the parrot, cocked open an eye and watched the departure. "Damned fool!" he muttered and retired back into mystic communion with recollections of a hundred and forty-three years.

Ananias' flight was not halted by curiosity this time. He raced past the scientist without even noting that for his master to be sprawled out on the floor before Megs' living-room door

was somewhat more peculiar than anything so far.

From his prone position, the doctor was making an acute study of his daughter's face and present conversation. Outside of a rather startled expression when he first arrived at the room, her features were the same as always—beautiful, hilarious, and somewhat vacant. Nothing happened to alter them. She maintained the subject of hockey with a heated, if not very intelligent, argument.

Rather dejectedly, the doctor arose unseen, went off to the servants' quarters. Carefully, he examined the shielding wires insulating those rooms from the cosmic vibrations. It was important that nobody know what he was up to. He must have unsuspecting minds to work with.

Mrs. O'Leary unexpectedly swept out of the kitchen, causing the doctor to jump back guiltily. She gave him a curious look, returned to the kitchen to announce she had caught him snooping again for the fifth time in three weeks.

Dr. Conklin had heard the comment. Reddening, he considered the fact that his secret experiment was liable to cost him prestige, possibly ptomaine as well, in his own household. Mrs. O'Leary was a woman given to strong opinion and somewhat violent action. At least he had learned one thing. Whatever effect his experiment was having over the rest of the household, his insulation screen was working properly. With thoughtful countenance, the doctor headed back to his laboratories. It was simply impossible. Something must be happening.

Pausing at Megs' door again, he peered cautiously in, listened. The conversation had changed from hockey. It was now about snake hunting and its excitement. Such was the continuity of human thought! It switched rapidly to the superiority of special brands of shoe

lacquer. The doctor shook his head disgustedly. The argument had gone on intermittently for years. In less time than they had spent arguing the matter, they could have made laboratory tests of every known brand.

He raced back to the laboratories, studied the intricate, delicate mechanism again. He checked and rechecked his calculations. With desperation, he threw up the power, increased the treatment. He found himself on the floor recovering from shock a few moments later. But he found Megs and Pat still talking about shoe lacquer. It was impossible for his experiment not to work. Yet, apparently, it was working only on the doctor.

DR. CONKLIN watched life under the castle roof avidly. His eyes, Megs noted to Pat, were growing astonishingly bright, and his speech faster. Decidedly, she thought, her father was up to something. But what, she couldn't find out.

All that week, the doctor prowled. He would appear with almost violent unexpectedness, or be caught prowling softly down the hall, or lurking behind doors. It wasn't possible, Mrs. O'Leary said, that he had become a little weak upstairs. But she didn't sound very convinced.

The doctor decided that he was expecting too much in too short a time. He made new calculations. If he intensified the experiment and gave three weeks longer, then, at the outside, definite signs should become evident.

Retiring to his laboratories, he announced he would not be seen for three weeks. Megs merely shrugged. Periodically he cooped himself up. She had more important matters to worry about. Her nearing wedding day for instance.

"The main trouble with the world," the doctor told Calypso, "is that people don't use their brains. If they did, there would be few world problems."

"Nuts!" squawked Calypso.

The doctor continued, long accustomed to Calypso's undignified opinions on all subjects excepting dates and crackers: "In three weeks we will see results. Megs will stop getting into arguments on peanut brittle. More serious subjects will be on her mind. And that young giant of hers will turn his brain to higher things than hockey and snake hunting."

Having cleared his troubles from his mind, the doctor increased the flow of rays. With the remarkable concentration to which he had trained himself, he put the entire experiment out of mind for the three-week period.

But downstairs a sense of dread foreboding pervaded the atmosphere. Ananias once actually drove Mrs. Haggerty away from the food she was preparing while he calmly chose the best fish for himself and marched off to unknown parts. Inspector, the half wolf dog, came in several times with a triumphant expression and great gashes upon his shoulders.

AT the exact end of three weeks, Dr. Conklin made the delicate adjustments upon which hung the success of his colossal experiment. Beneath the castle walls, he saw wolves circling in immense packs. They howled mournfully, a noticeable discordancy in their voices.

Momentarily his mind lingered on the wolves. It had not been a hard winter, food was plentiful. It was peculiar they should be gathered in such large packs. Their cries, too, were unusual. No particular note such as the hunting or mating cries predominated. It was more like a babel of wolf jargon.

He shivered, turned inside, gave the last burst of cosmic treatment. What had happened to Megs and Pat he did not know. He did not know quite what he expected, even. But something must have happened, some effects show,

after this time. Seeing them abruptly, he would be more acutely conscious of any change.

Descending the tower, the doctor listened in at the door of Megs' rooms. She was heatedly holding forth on the benefits of marrying Pat and living in Paris where she could be a few months in advance of styles.

The doctor's brow grew moist as he eavesdropped. There was no great change in his daughter's ideas. This sounded like anything she might ever had said. But she was offering astonishingly logical arguments; arguments which had taken thought, a lot of it, and consideration of all angles.

Certainly his experiment had borne fruit. But what fruit! With baited breath he waited for Pat's reply.

"I've got it!" Pat suddenly boomed. "Megs, I'll be the hockey genius of the world! Napoleon used a lot of the tactics in his military moves. But I've improved on his theories. He forgot one or two important mathematical elements!"

The doctor's heart pounded with a deep sense of failure. He had tried to produce greater use of brains. Brain power had not done Megs any good. She had simply used it to think out more forceful and intelligent arguments to back the whimsical ideas she had always had.

In Pat's case, his mind had leaped beyond the instinctive stage it had always dwelled in. But increased brain power had not broadened his intellect. He had simply applied greater intelligence to his native interests.

The doctor compared the two with himself. Excepting for faster thinking and a sense of immense acuteness, he could find the experiment had changed him little. But his brain had been highly trained for years. What happened was simply that lower brains with greater room for expansion had leaped ahead in capacity for thought, but with-

out changing basic interests. A complete idiot with an obsession for eating bananas would have simply used greater imagination and intelligence in getting hold of bananas.

Wearily, the doctor turned away. He had hoped to make real thinkers of these two—real thinkers of the world. The X factor in his calculations had thrown his plans off course. Perhaps there was still some means of making his theory work out.

At the head of the stairway the doctor looked down on Ananias, the cat, and Inspector, the dog. They were just passing each other below.

"How are you, kid?" Ananias asked in a meowey voice.

The doctor jumped. Yes; it was certainly the cat that had spoken. There was nobody else down there to speak.

"I'd be a hell of a lot better off if there weren't so many wolves outside," Inspector growled. "I don't suppose Papa Conklin knows it yet, but I'm about the only protection this castle has against that pack, in spite of all his fancy equipment. Those babes outside are out to storm this place."

The two animals danced off toward the cellar together.

The doctor continued on his way. So that was what the rays had done! While Pat and Megs had been stimulated to use a little more intelligence, animal brains had been stimulated to full use. Cells which had been undeveloped and dormant had been thrown into service. Domestic animals, with memory of the spoken language, would be capable of human thought and speech. But their basic natures would remain.

Then the wolves outside were not there by coincidence. They had mobilized for a planned attack upon the fortress of those they hated, man and man's protector, the dog. They were hindered by a lack of language. But that would come.

Loose upon the world, cosmic rays would not accomplish intelligent and broader thought on life and problems. It would simply increase the thought power applied to basic desires and conceptions. Criminals might become brilliant—but not honest. The killer would simply work out more intelligent methods of committing murder and avoiding detection.

THE DOCTOR dragged his feet toward the control room. It had taken years to build the cosmic apparatus. He glanced at his prize, a blue-glowing tube it had taken years to adjust properly.

"There's no way to get around basic nature," the doctor muttered wearily.

Well, he would put the cosmic power where there was no chance of wolves and inferior brains making themselves masters of the world through it. He would destroy it, blow the tubes.

Walking toward the master switch he threw on the juice, crossed two wires. There was a terrific roar, a violent burst of flame; then complete quiet inside the castle. Through the quiet came the wall-dimmed howl of the wolves. The equipment was destroyed.

"Wow! What a racket!" Calypso squawked as she picked herself off the floor and waddled toward a cracker bowl. "Damned fool! If you'd given that blue gadget more juice in the first place, you'd have done the trick. You figured you'd make everybody an individual. What you needed was to stimulate the desire of man and beast to copy the civilization and intellect of those above them. It would have been an endless chain of intellectual development. The wolves would want to be like the dogs and the dogs like you. And you'd have wanted to be like me, doc. I haven't lived a hundred and forty-three years for nothing!

"Well, let's have a cracker. Here's looking at you!"

The Ultimate Metal

*A metal of peerless beauty and incredible strength—
with seeds of catastrophe hidden beneath its sheen*

by Nat Schachner

Illustrated by Elliot Dold

TWILIGHT laid its protective mantle over the roaring life of New York. For one breathless moment there was a hush, as nature had intended. Then the giant city girded its limbs defiantly and accelerated the headlong tempo of its existence.

Little lights winked into being over the massed masonry of the midtown section as lawyer, broker, and business executive whipped flagging energies to renewed effort. The streets, huddled in canyons, festooned themselves with long necklaces of radiant pearls. Broadway flared into a seething white cauldron of strange mechanical figures that shouted from the housetops the virtues of toothpaste, streamlined cars, morticians, beauticians, and ivory, apes, and peacocks. The power-house managers gazed at the mounting loads on their output indicators and should have been content.

Except for one thing—the threat implied in the Coulton Building.

This was strange. For such a structure, even though not quite completed, ought to have gladdened the hearts of power-company directors and stockholders alike. One hundred and fifty stories high, subdivided into innumerable offices and suites, expected to house a veritable city of fifty thousand people, it was comparatively easy to calculate the exact kilowatt consumption per year. Given a definite number of short, dark winter days, the average number of cloudy, storm-gloomed days, the driving

compulsion that forces typewriters to clatter far into the night, the usual percentage of employers who keep pretty stenographers working overtime, the normal number of after-hours' poker games, which to trusting wives masquerade under the peculiar name of important board meetings—given all these, and the rest is mathematics.

But—and there was the rub—mathematics weren't necessary. Except for the negligible amperage required for the operation of elevators, vacuum cleaners, et cetera, electricity might just as well have never been discovered. That was why the Coulton Building created such a furor in the practical as well as the scientific world. That was why rubber-neck busses, filled to the brim with old ladies from Keokuk, primly excited schoolmarms from Walla Walla, bored garment buyers from Texas, and honey-mooners from Heaven knows where, made special detours to Central Park South, and barkers inhaled deeply before lifting megaphones to lips.

This very evening Thomas Coulton himself stood importantly in the cleared plaza before his already world-famous structure. He towered over the respectfully insistent mob of reporters even as the Coulton Building towered over and dwarfed its neighbors. He was a big man, heavy of beam and of head, with a thunderous voice, which, combined with the knowledge that he, and his father before him, possessed millions, was



***"For Heaven's sake, Dean, do something about it! Anything!
But stop it!"***

sufficient to overawe any normal human being.

He did not look like the average conception of a world-famous physicist—you know the type: pale, thin, ascetic, eyes burning with the pure scientific ardor—but, then, neither did his assistant, Harley Dean, standing just now inconspicuously on the outskirts of the thrusting hurly-burly of men with pads and pencils in their hands.

Harley Dean might have passed for the third from the end in the stag line at a débutante party, and he would certainly have fitted very well into flannels and a powerful backhand stroke during a Long Island week-end. Yet Dean, in fact, was the true discoverer of *evanium*, No. 93 in the scale of elements. It was he also who alloyed it with other and more familiar elements so as to make possible the Coulton Building.

For one man, however, who had heard of Harley Dean, there were thousands who knew Thomas Coulton. It was his splendidly equipped laboratories and unlimited financial resources that gave Dean the chance to pursue his experiments. It was Coulton's colossal egotism and desire to be considered a scientist as well as a millionaire that made him ostensibly chief of the laboratory, whereby the world at large was given the impression that he, Thomas Coulton, was the only begetter and originator of *evanium* and its alloys.

Harley Dean did not mind that particularly. Such has been the fate of true genius ever since wealth took up the arts and sciences in a big way. He would smile a bit caustically at Coulton's booming periodic sentences that made such swell copy in the daily news sheets, and go on with his work.

But now he was not smiling. He was frankly worried. Vague fears assailed him; fears that loomed more and more ominously as the days went on, one by one, and the tremendous undertaking neared completion. Yet everything

looked all right, and there seemed no foundation for his worried preoccupations except the overcautiousness of the true scientific investigator who has, he feels, insufficient data on hand to justify jumping at conclusions.

Coulton laughed at his expressed qualms and pushed his plans for the building as fast as he could drive engineers and architects along. His optimism was as large as his frame; Dean was a plodder with his nose buried in his work, while he, Coulton, made lightning decisions and painted with tremendous brush strokes on gigantic canvases.

"What you need, my boy," he told Dean gustily, "is vision. Yes, sir; vision with capital letters. If I listened to you, the world would stand still. Nothing would ever be done. Good Lord, man, we've tested and prodded this damned alloy for a month now. What more do you want? The millennium to come? Or maybe you own a share in the electric-light companies and the steel trust and *that* makes you nervous. No, sir; I'm going through with it—now!"

THE "WE" of course was purely euphemistic. All that Coulton ever did was breeze into the laboratory an hour or so a day, other engagements permitting, during which time he managed to break valuable instruments, muss up important and delicate experiments, and generally get into Dean's patient way.

His familiar voice rose oratorically on the evening air. This was his element, talking in large phrases to reporters. It irritated Dean for the first time. His sense of humor seemed unable to cope with his chief to-night. Maybe it was because he was tired; perhaps because the loom of the practically finished building filled his sleep with nightmares.

"Look at it!" Coulton made a grandiloquent gesture. "The most magnificent thing the world has ever seen. All seven wonders rolled into one, and

some more that the old Greeks never counted."

Obediently the reporters craned their necks. It was in truth an awe-inspiring sight. The great structure towered fifteen hundred feet straight into the air, its smooth, shining metallic flanks instinct with grace and beauty, yet giving the impression of tremendous power and thrusting strength. This in itself was an innovation—all-metal construction. But the miracle that brought gasps of wonder to thronging sight-seers and probing scientists alike was the strange luminescence of that metal.

Dusk had turned to darkness. New York was a prickle of man-made lights against a blue-black sky. But the Coulton Building scorned all adventitious aids. It glowed with innate fires; it radiated pure white softness, strong as the noonday sun, yet glareless and soothing to the eye. Within as well as without, the silver-metal walls made high noon out of conquered night.

A sky-pointing vision out of fairyland! The sound of hammering filtered down from the upper stories. The last finishing touches were being put to the gigantic structure. October the first was a week off.

"Gentlemen," Coulton boomed, "let me give you a tip. Sell electric-power stock short. Artificial lighting is outmoded as candles and kerosene lamps. Within five years every new building in the good old U. S. A.—yes, sir, in the world—will be made of *Coultonite*."

"Maybe you'll let us in on the ground floor, Mr. Coulton," one daring individual piped up. "I got a couple o' hundred bucks I'd like to invest."

Coulton beamed and shook his head. "Sorry, boys, but I'm going on my own. You know," he said confidentially, "I have just a little of the filthy lucre myself." He smiled at his genial wit, and they smiled with him.

"Do you mind going over the story of

your discovery again, Mr. Coulton?" a thin, sharp-nosed reporter asked.

"Not at all! Not at all!" The millionaire's voice took on added orotundity. "I had been on its track for some time. Then one day, after months of grueling toil—Eureka! Success! Before our excited eyes, carefully inclosed in a vacuum, was a dark-green, flaky solid. A new element, No. 93 in the scale, never before seen or handled by human beings. A new creation, a tribute!" he coughed modestly—"to hard patient work, and, may I add, a slight touch of—er——"

"Genius!" some one suggested.

Coulton laughed heartily. "I wasn't going to use that word, but—— Anyway, we had scarcely feasted our eyes on it when, *poof*, it was gone, vanished. In its place was a gas. We tested this and found it to be Uranium X. Again and again, as we prepared our new element, it vanished and Uranium X gas resulted. So we named it *evanium*, because it was so—what do you call it—evanescent. A neat touch, eh?"

They smiled appreciatively at the great man.

Some one asked: "How long did *evanium* last before it changed?"

"Why—er—that is—let me see—oh by the way, Mr. Dean," he called over the heads of his auditors, "do you happen to remember the exact number of hours?"

"Thirty-five and three tenth seconds," Dean replied clearly from the outskirts. The steady glow of the building revealed a slight bitterness in his eyes that was quickly masked.

"My assistant," Coulton explained to the reporters. "A very good man for details. Well, anyway, nothing much could be done with an element that, so to speak, did not stop even for a bowing acquaintance. So we experimented. We tried combinations with other more familiar elements; we made alloys. Thus it was that we discovered *Coultonite*."

It's an alloy of *evanium* with titanium and beryllium in certain definite proportions. Of course the exact proportions must remain our secret. You understand the reasons for that, don't you, boys?"

They murmured that they did. Coulton was a business man as well as a great physicist, and he was not in business for his health.

"Yes, sir," he went on and on. "I had that alloy tested for a whole month before I decided on the Coulton Building. It answered every test. Boys, there's nothing like it in the universe to-day. The ideal, the perfect metal, for every conceivable purpose. It is lighter than aluminum; its tensile strength is—uh is——"

"One million, two hundred and thirty thousand pounds to the square inch," Dean interjected.

"Exactly! It is harder than diamonds, yet extremely malleable. It is noncorrosive; its melting point is high; and Young's Modulus of Elasticity is—now let me see——"

"Seventy-four million," Dean put in, a trifle wearily.

Coulton threw out a gesture. "So there you are, boys. *Coultonite*! Greatest discovery of the ages!"

II.

THEY dispersed slowly, the reporters.

Dean waited unobtrusively until they were all gone, then he said: "Now, look here, Mr. Coulton. I can't get it out of my head that something is going to happen. We're dealing with unknown forces; with an element that never existed until we created it. More, an element that fades out right before your eyes. You should have waited until more work was done on the alloy, until it was tested by the passage of time, until——"

Coulton's brow darkened. "Going all over your fool theories again, eh?" he

said angrily. "By Heaven, I'm sick and tired of your croakings! I'm paying you good money to work for me, and I don't want bellyachings."

Dean flushed. His lips tightened; his good-looking face ridged into hard lines.

The millionaire recognized the storm signals and backed down. He needed Dean. Without him the whole structure of his pretended scientific eminence would collapse.

"O. K.," he said hastily. "I didn't mean that, of course. But for Heaven's sake, you worked a whole month prying and experimenting before I decided on building, didn't you?"

"Yes, but——"

"And the alloy answered every test and was stable as a rock, wasn't it?"

"Yes, but——"

"Then why worry? It's too late now, in any event. The building is up, finished, completed."

Dean acknowledged to himself that his fears, premonitions if you will, were no doubt groundless. Nevertheless he blurted out desperately: "At least, Mr. Coulton, do this much: Let the building remain untenanted for, say, six months. If by that time everything is O. K., then we'll know that the alloy is good and stable, and you can go ahead confidently with the rest of your plans."

Coulton stared at him unbelievably for a moment; then he threw back his head and roared. "Idle for six months!" he gasped, tears of laughter rolling down his heavy jowls. "That's the richest I've heard in years. An investment of ten millions, hard cash, eating its head off in taxes and interest, just because young Harley Dean feels overcautious about a scientific result." He wagged his head pityingly. "You may be a damn good physicist, Dean, but you're sure an awful business man. That building of mine is a sell-out, from roof to cellar, at fancy rentals starting October first, and you want me——" And he doubled up again with mirth.

IT WAS a fact. Every firm it seemed in the world clamored for available space in the Coulton Building. Every professional man, every huge corporation, every fly-by-night concern peddling doubtful wares, yearned for the *cachet* that this world-famous address would bring. Coulton's renting agents rubbed their hands gleefully and rejected all applications that could not bear the cold light of Dun's and Bradstreet's Grade A ratings. Even at that, there was a waiting list a mile long.

On October first, the hegira began. From early morning until late at night the vans made traffic-snarled queues before the freight entrances, and furniture and shiny new equipment poured in in an unending stream. Police lines had to be established to hold back the merely curious.

The opening of the magnificent structure was attended with tremendous ceremony. Scientists and engineers mingled with bankers and high officialdom. The Governor of the State and the Mayor of the City walked arm in arm and made appropriate speeches, praising Thomas Coulton, his learning, his science, his initiative, his public-spiritedness, his broad vision, his home life, his wealth, his father and his father's father until Harley Dean, wedged in among the lesser scientific fry, grew slightly nauseated. Learned societies sent delegations and awarded medals, cameras clicked and sound tracks recorded every breathless syllable.

Only the representatives of the utility companies and the steel trust were conspicuous by their absence.

OCTOBER the first passed, as all days must. So did the months of October, November, December. Nothing happened; that is, nothing to justify Dean's Cassandralike warnings.

The building was even more of a success than had been anticipated. Tenants were in ecstasies over the strong,

even lighting that emanated from the walls. It never faded; it never succumbed to the ordinary annoyances of burned-out fuses, defective bulbs, overloaded lines; it shed its eye-resting illumination into every nook and cranny of every office, and the dull silvery metal lent itself to rich and tasteful decorative effects.

Business boomed and prosperity smiled on the tenants. To be an occupant of the Coulton Building was a hall mark of distinction, a hand-picking out of the ruck of common firms. Potential clients and customers came to the offices, primarily to see with their own eyes the well-publicized wonders, yet naturally and inevitably to leave behind them a growing trail of orders and cases.

Everybody was happy; but most of all Coulton. He walked on air; he wore his medals and the decorations presented by admiring foreign governments even on his dinner coat. In his mind's eye he saw himself the financial dictator of the world.

For in the light of the tremendous success of his first venture, letters, telephone messages, cablegrams and radio-grams poured in in an unending flood from all over the earth, clamoring for tonnage and more tonnage of the miraculous *Coultonite*. The steel trust capitulated and sent emissaries to devise a working arrangement; the governments of Europe made feverish inquiries; far-off Mongolia and farther-off Patagonia were equally represented in the torrent of orders.

Coulton plunged. He sold out all his investments; he transferred every stick of property—except the Building of course—into available cash. Immense factories mushroomed on the Jersey flats, scouts scoured the world getting options and leases on all known titanium and beryllium deposits, and Dean worked himself haggard devising new and more economical ways of separat-

ing these treasures from the dross. Fortunately, evanium could be synthesized by powerful neutron bombardment from quite common sulphur. And, even more fortunately, only a minute trace of the evanescent new element was required in the manufacture of the alloy. Ten thousand men worked and drew salaries at Coulton's behest.

"Well, my young croaker," Coulton said jovially to Dean for the hundredth time, "what have you to say now?"

IT WAS Christmas, and still everything was well. Coulton Enterprises, Incorporated, was magnificently installed on the one hundred and forty-ninth floor of the gigantic tower. The view from every porthole was overwhelming in its breath-taking sublimity.

This was another innovation that was in itself a stroke of genius. It had been Dean's idea, diffidently suggested, and taken up with his employer's characteristic enthusiasm and large genial forgetfulness of its source.

Windows perform three functions. They bring light into opaque structures; they permit the influx of air; and they furnish pleasing vistas to those habitants on whose hands time might otherwise have hung heavily.

Of these three, the first two are fundamental; the third purely æsthetic. But modern air conditioning has done away with the necessity for wide spaces to permit the ingress of sufficient breathable oxygen, and *Coultonite* did away with any possible lighting requirements for windows. Therefore only the incidental æsthetic use remained.

Business men, however, are eminently practical. They adore art and beauty, provided it does not interfere with their profits. And the giving over of tremendous surfaces merely so that stenographers and clerks could gaze vacantly at the far-off ocean, the more placid Sound, the other and punier battlements and spires of New York, was abhorrent

to a right-thinking man of affairs like Coulton.

So windows *in toto* seemed doomed, until Dean had his idea. Provide small round portholes, like those on ships, he suggested. They would take up little enough space. Have good magnifying lenses inserted instead of ordinary glass. And, behold, the panorama becomes supernal! It was a marvelous publicity stunt as well as a selling point.

But to return to Coulton's question. Dean had very little to say. In the beginning he had labored his point early and often, without result.

"Perhaps you're afraid to come with me to our new offices," Coulton had sneered. "If so——"

Whereupon Dean, not being a coward, had without a word supervised the transfer of all his precious instruments to the eyrie of the Coulton Building.

Christmas passed and the New Year was ushered in with appropriate ceremony. The great structure had become a familiar landmark; its shining, ever-glowing exterior no longer excited any more than a passing glance from native New Yorkers. Nothing could possibly seem more stable, more enduring. The factories reached peak production. The first batch of *Coultonite* lay in neat ingots, ready for shipment. Dean went on to other researches, plunged into them with consuming ardor. His fears had abated, were practically forgotten.

III.

THE FIRST intimation that all might not be well came from a night watchman. It was his duty to make the rounds of the building once every night, to check against open doors, marauders, mislaid tenants, and in general to observe that peace and virtue reigned triumphant.

At ten o'clock on the morning of January 9th he marched rather sheepishly into the great man's private office,

twirling his hat with embarrassed fingers. It was long past his quitting time, but he was a Scotchman with a devout sense of duty, and he felt it incumbent on himself to report direct to the big boss. Dean was in the room, too, excited over the successful termination of an important bit of work, pouring it out in eager words to a half-comprehending chief.

"Well, what is it, my man?" Coulton interrupted his assistant with a certain measure of relief. It was due to this that McDonald had penetrated the inner sanctum so easily.

"Well, it's this way, Mr. Coulton," McDonald cleared his throat apologetically. "I'm the night watchman, ye see. And I was a-making my rounds last nicht as was usual—I take my duties verra serious—and, let me see, I was on the seventy-third floor—no, it couldna been that, for I remember verra distinct I looked up after 'twas over and I saw a g-r-and picture of a Clyde-built steamship on the wall, so it must have been——"

"Never mind what floor you were on," Coulton growled impatiently. "What happened, what brings you to me instead of the super?"

"I'm a-coming to that, sir," McDonald said with imperturbable gravity. "It's verra hard to describe. But there was I, going about my proper affairs, trying doors, everything peacefullike, when it happened." He paused, and a slightly frightened look crept into his clear candid eyes.

"Well, get on with it," the big man boomed.

"Why, sir, the whole building seemed to give herself a shake. It was verra funny. It didna sway, you understand, like as if there was a storm, or make a g-r-reat noise. It seemed more like as if every little part were a-rearranging itself, so to speak, as if it were a-taking on new positions. 'Twas a verra peculiar sensation, I might say, sir, like"—

he groped for words—"like the blooming building were *a-growing*, sir. That's it, Mr. Coulton. I r-remember, when I was a wee lad——"

"McDonald!" Coulton looked square into those clear blue eyes, half hidden under frosty white lashes. "You've been drinking!"

The watchman drew himself indignantly erect. "Sir-r-r!" he sputtered. "I never-r touch the stuff, except—except, of course, a wee drap now an' then on a cauld nicht."

"Exactly!" Coulton boomed with self-satisfaction. "Now go home and sleep it off. And remember, if you're caught drinking while on duty, you're fired! Do you understand?"

"Yes, sir." The watchman backed agitatedly to the door, turned and stumbled through the outer offices, shaking his head and muttering to himself. That "wee drap" now—it wasn't enough to make him hear such a most peculiar noise. Or was it?

Coulton snorted. "Nothing like scotching a story like that right at the beginning, eh, Dean?"

But Dean had not been listening. He had been engaged throughout the interruption tracing figures on the pad before him. He was full of his research.

"Now get this, Mr. Coulton," he said eagerly. "I moved the fluorescent screen to a forty-five-degree angle and inserted an additional magnet."

Which was a pity. For Dean was the only one who at that particular stage might have comprehended the full import of McDonald's story.

THE NEXT phase was plain for all the world to see. It occurred about a week after the so-called growing pains that the night watchman had tried to describe.

Dean was in the laboratory, working late. Cathode tubes glowed, huge magnets swung on gimbals, lightning flashes darted over the glistening surface of an

electrostatic ball. The *Coultonite* walls cast their even, white illumination over everything. The setting of the external sun had passed unheeded.

Dean grunted, ran quick fingers through unruly hair, and jotted down figures in his notebook. He did not hear Coulton's entrance. Nor was this surprising. For it was wholly unlike his usual assertive floor-shaking stride.

The big man stood a moment in silence. Then he coughed—a very apologetic little cough. It was all quite out of keeping with the man.

Dean looked up. "Hello, Mr. Coulton!" he said abstractedly and would have returned to his calculations. But something in his chief's face held his wandering attention. It was strained, a bit anxious. His eyes were wide on the walls of the spacious laboratory.

"What's the matter?" Dean asked.

Coulton passed a hand that shook slightly over his brow. "I don't know," he said. "But look at those walls."

Dean stared around in some surprise. Then he saw. The effect was faint, almost imperceptible. It would have passed unperceived had Coulton not directed his attention specifically to it.

The luminescence was no longer pure white, with that faint tinge of blue to it that made it almost an exact replica of the light of outer day. Instead, it shimmered a bit. Little fleeting dabs of color moved in rapid, swirling succession over the *evanium* walls. They melted into each other; they glowed and disappeared; they vanished into pure white and restarted their ceaseless drift.

Opalescence! Iridescence! Like Newton's rings on thin films of oil! It was beautiful, this glowing shift of patterned colors, but—a little disturbing.

Coulton said: "It's much more effective on the outside walls. The whole building is a play of colors. Look at the crowds."

Dean moved half consciously to the view-port that was tilted at an angle

to bring into focus the panorama of the streets. His brain was racing vainly to comprehend this sudden shift of light into the spectrum.

The powerful glass brought up clearly the swarming streets below. It was past midnight, when Central Park should have been a deserted gloom of trees and deep shadows. Now it was black with thousands of dim-seen faces staring up at the great structure. Broadway was a crawling ant heap, so were Fifth and Lexington.

Dean whirled around. The interplay of colors mottled everything—very faintly. It was not enough, however, to interfere with normal vision.

"What do you make of it, Dean?" asked Coulton. He was a bit scared, more than he cared to admit.

"It's hard to tell," Dean admitted. His forehead was ridged with furrows of thought. "Normal iridescence is the result of a shift in the angle of the observer so that the thickness of the film through which the reflected light must pass in coming to him changes also. But this does not apply here. In the first place the light is not reflected; it is inherent in the material. In the second place we as observers are stationary."

"Then what?"

Dean disregarded the interruption. "Some inherent change must have occurred in the constitution of the alloy. If that is the case, then *Coultonite* is not stable." With relentless logic he went on, while Coulton gaped, for once unable to talk: "If our alloy is in the process of change, then this comparatively harmless play of colors may be but the prelude to more profound and far-reaching internal rearrangements."

ACROSS Coulton's mind flashed the strange story the night watchman had told. He had used that very word—rearrangements!

Dean stared strangely at the walls.

"They may end in purely harmless effects. On the other hand, they may——"

His voice trailed off. For a moment there was silence, while Coulton's head gradually cleared. The business man no longer masqueraded as a scientist. He was marshaling his forces for what he knew was coming.

Dean took a deep breath. "Coulton," he said steadily, "the building must be evacuated—at once. Until these effects can be studied in detail; until the passage of sufficient time proves that it is safe."

The millionaire snarled like an animal at bay. His face was a furious mask.

"Stop that damned nonsense, Dean!" he roared. "Have you gone crazy? Do you realize what you are saying? The Coulton Building is fully rented. The annual rental is twenty million dollars per year. The upkeep runs to sixteen million dollars. You're asking me to throw away a profit of four million dollars; pay out of my own pocket the enormous upkeep, simply because the walls of the building are changing their colors a bit, because you're afraid of—of Heaven knows what."

Dean looked at him with troubled eyes. "Yes," he said very low. "Just because I *am* afraid—of Heaven knows what!"

Coulton clenched his fist. "You forget also," he shouted, "the effect upon the world, upon the avalanche of orders waiting to be filled. Why, the mere shutting down of this building, no matter what the excuse, would bring a flood of cancellations. Every penny I have, every penny I could scrape, borrow, or steal, is in this venture. I'd be ruined, man, ruined! The plants would close, ten thousand men would be thrown back on the relief, banks from which I borrowed heavily would not be able to make the grade. And why? Because you, Harley Dean, without even knowing what this little business of color really means, set yourself up as a dictator over

lives and fortunes. Well, you're not going to say anything, or do anything! Do you hear?"

The words echoed around the vast laboratory. His breath came in deep stertorous pants. There was nothing suave or hearty about this millionaire, at bay with his threatened millions.

Dean was not afraid of him; had never been. His job, this comfortable salary, meant nothing. Nor did the dollars and cents involved. But several things that Coulton had shouted struck responsive chords. The thought of ten thousand men thrown out of work, the thought of possible closed banks with consequent disaster to thousands of depositors, made him hesitate.

After all, on what did he base his pronostications? On a mere iridescence, a play of color. The very thing that made *Coultonite* fabulously successful was its glow. The tiniest shift in internal structure, the slightest rearrangement of molecules and planes of crystallization, induced possibly by normal vibration, could account for the shifting iridescence. It did not necessarily argue anything against the inherent stability of the alloy itself.

He had not paid any attention to McDonald's tale, and Coulton, ruin staring him in the face, did not see fit to recall it to his mind. If he had known of that midnight mutation—but, then, arguing about if's is a most unprofitable procedure.

Dean said indecisively: "There's something in what you say, Mr. Coulton. Perhaps——"

His chief looked like a condemned criminal relieved from the hangman's noose. "Of course, Dean," he said, laughing gustily. "I knew you'd see things in the right light. Now we'll just let things ride a bit. Nothing's going to happen. If anything *does* turn up that looks dangerous, I'll be the first man to give in. Human life is more important than——than——" The words somehow

stuck in his throat. "There'll be plenty of time to act. No use going off half cock."

Unfortunately when it happened, there was not time. But how could a business man be expected to know that? Dean did not blame Coulton afterward; he had acted only according to his lights; but for himself he held no excuse. He should have known, should have insisted.

THE STRANGE new iridescence meant only a fascinating display to New Yorkers. Once more the Coulton Building was the cynosure of native eyes. In truth, the shifting glow of colors, ranging the spectrum, deepening from palest yellow to darkest indigo, made the straight cloud-thrusting walls a wonderland of beauty. The world came to stare and gape and utter little "Ahs!" and "Ohs!" Not a trace of alarm, of foreboding, anywhere.

Nor did the tenants object. The pearly display did not seem to affect the normal texture of the light, and it made a gorgeous decorative texture out of what had been after all a mere blankness of illumination.

Dean, however, in spite of his yielding, remained grim and anxious. He spent days and nights in his laboratory, hardly sleeping, hardly eating, investigating the new phenomenon, working with secretive fury at certain mysterious apparatus.

Coulton, booming as heartily as ever, kept discreetly out of his way. A queer fanatic, his assistant, he reflected. He made a mental note to get rid of him as discreetly as possible whenever the opportunity arose.

IV.

THE NEXT step in the drama came about five days later. This time it occurred in broad daylight, in the full tide of human affairs, when the building was crowded with working humanity. Fifty

thousand people—men of substance, heads of great corporations, lawyers, motion-picture executives, exporters, stockbrokers, financiers, clerks, book-keepers, stenographers, office boys, elevator men, window cleaners, mechanics, visitors on business, visitors without, insurance agents, peddlers of fine smuggled cigars, necktie vendors—in short, a complete cross section of American life.

It came first as a little rumbling and shaking. Every one stopped work, looked at each other with questioning gaze and a slight uneasiness. An earthquake? Impossible! New York had never had an earthquake. Now take Los Angeles, Chile, Japan—that's where the ground shook, not in good old New York.

The rumbling and shaking grew, the walls made crystalline clatter. Ann Merriweather, good-looking and efficient secretary to Alfred Whitcomb, president of Vitex Pictures, froze with pencil poised in mid-air. Whitcomb, red-faced, well-fleshed, shrank in his chair. In the back of her mind floated an inconsequential image—that of a toy of kaleidoscope, the property of her small brother, in which the various colored segments of glass fell with just such a crystalline clatter into strange new combinations, new patterns.

The clatter increased. The walls seemed to swell and retract into position again. Strange shuddering groans issued from the tortured metal, almost human in their eerie wails. The sound of planes rubbing on planes, of molecules in anguish, stretched beyond all reasonable limits, of new elements in parturition.

The noise grew to an unbearable clamor. It rasped and shrieked in the ears of the affrighted tenants. The walls moaned with the wind of creation.

Human sounds joined those of grating metal. Screams, yells—all the confused cries of men and women afraid for their lives.

"The building is falling!" Morton Swaley shouted and ran for the door of his luxurious office.

The contract lay unheeded on his Circassian-walnut desk; the fact that he had just hooked his sucker; that the victim had pen on paper to sign his name, was forgotten. A split second start meant life—and other suckers. His particular racket might get short shrift in the Great Beyond.

The halls were filled with a dense struggling mob. Swaley, by virtue of his flashing start, led the pack to the elevators. He panted at the unwonted exertion. His sharp, weazened features were puffed with fear. Damn it, why had he taken offices on the ninety-sixth floor?

He pronged the elevator button with trembling fingers and went down, screaming and kicking, under the sudden rush of fear-crazed men.

It stopped as suddenly as it had started. One instant the walls ground and heaved on themselves; the next all was dead silence. Bland metal, quiescent, innocent of expression, shining with a light canary-yellow luster.

The human screams died less quickly. The half-crazed people looked fearfully around, saw nothing amiss. Panic ebbed slowly from them; a few even who had considered themselves cool-headed, brave, felt a bit sheepish. Nevertheless fingers pressed on elevator signals. They might have saved themselves the exertion. The elevator boys had decamped at the first sign of disaster. Nor would their presence have mattered. The juice was off.

It was Jimmy, the gamin bootblack, marooned on the fifty-eighth floor, his blacking box still clutched tight in grimy hands, who first noticed the new state of affairs.

"Say!" he shrilled. "Will ya lookit dat!"

The walls were beginning to crawl!

That was the only possible way to

describe it. The solid-seeming *Coultonite* flowed on and over itself, faster and faster, until it was a mighty flashing river of metal, dazzling the beholder with the swiftness of its flight. Yet it did not progress or lose its binding contours. The limiting walls remained in position, and the alloy was hard as ever to the touch.

A liquid-solid, Dean was to describe the new state.

To Dean, hand on a switch that would send fifty thousand volts arching between the electrodes of a reduction furnace, the sudden birth pangs of the building came as a blinding revelation. The knife edges contacted but nothing happened, even as he had anticipated.

He sprang at once to the emergency power plant that he had rigged up during the week. There was no *Coultonite* in its construction. He plugged the connection with swift, sure movement. A blast of lightning seared from anode to cathode. He grunted with satisfaction. But even as he did, the roaring stream of incandescent molecules faltered, paled into a weaker red. Some outside force was combating his power, neutralizing the hurtling flow of electrons.

Even this, however, he had prepared against. Breathing hard, he raced to another machine; a curious funnel-shaped apparatus attached at the smaller end to a long Coolidge tube, which in turn connected with a lead-sheeted casket. The whole thing was mounted on a turntable, at the periphery of which were thick bar magnets, heavily coiled with copper wire. Not an ounce of *Coultonite* had been used in the entire construction.

Dean threw a switch and breathed a prayer to the gods of science. The noise and the howling were deafening by now, and the arc of the electric furnace flickered into a pale thin line.

The Coolidge tube glowed with faint blue, the turntable started to rotate. Dean dug his nails hard into the palms

of his hands. The next few seconds would determine his fate, and possibly the fate of all the multitudinous occupants of the building.

SLOWLY, very slowly at first, the table went round and round. The pencil flame that barely forced its way before the electrodes wavered, but did not lessen. The opposing forces had almost neutralized each other. Not quite, of course. That would have been a miracle. A tiny differential either way would have tremendous consequences.

Dean waited, face rigid, for the break that meant possible life or death. The walls were beginning their peculiar circumscribed flow. The physicist groaned. That, then, was the second stage. He surmised the third. But the ultimate, the one on which everything depended, was still in the womb of events, unknown, unknowable.

Was it imagination or was the speed of the turntable increasing? Some one shouted almost in his ear. He did not turn. A heavy, trembling hand plucked at him. He shook it off impatiently.

There was no question about it now. The table was rotating more and more rapidly, the glow in the tube became an intense blue, and the arc surged into jagged lightning.

Then, and then only, Dean turned. It was Coulton—but a pallid, flaccid Coulton. All the starch, the aggressive heartiness, had gone out of him. His booming confident voice was a cracked whisper; his cheeks were drawn; his eyes terrified.

"For Heaven's sake, Dean," he implored hoarsely, "what is it; what does it mean? You'll have to do something!"

Dean viewed his chief with faint distaste. "I've done all I could. We two are safe, at least temporarily. But the others, the fifty thousand innocent victims of your greed and recklessness, I don't know about them. Perhaps, if the forces involved do not run beyond hu-

man imagination, I may be able to save them."

Coulton took a deep breath. The color moved back into his cheeks. He did not even resent Dean's biting characterization. The one thing that penetrated his fuddled brain was the fact that he was safe. Nothing else mattered.

A haze was forming in a hollow shell beyond them. It shimmered, it tinged faintly with blue, yet it did not hide the laboratory walls, still imbued with that insane fluidity.

The table whirled faster palpable emanations poured from the revolving funnel; the magnets were a blur of speed on the rim. The shell widened its radius, slowly but surely.

"But what does it all mean?" Coulton ventured.

"What I was afraid of from the beginning. *Coultonite* is not stable. The *evanium* in its composition was merely masked, not nullified. It has been working stealthily, along unknown lines, disintegrating, sending out streams of countless electrons, positrons, neutrons, photons, and Heaven knows what else. The whole alloy has been in constant ferment, imperceptible to our most delicate instrument. Then, suddenly, when the heaven had fulfilled its function, the solid, stable, eternal-seeming metal fell into a new pattern. That has happened twice now. The first was a mere color-difference. The second we are now in. I'd call it a new form of matter. A liquid-solid. There will be more."

He stopped a moment, listening. There was silence within the shell of vibrations, broken only by the ceaseless hum of the turntable. The rest of the building might have been a vast tomb, for all he knew. Yet there was nothing he could do, more than he had done.

The shell of force he had thrown around them effectually damped all sound waves, nor could it be penetrated without grave danger. The only hope for the others, even for themselves, lay

in the doubtful possibility that he had sufficient power to overcome the inimical forces inherent in the *Coultonite* and that the shell of safety would widen its radius sufficiently to inclose the entire building.

"How far will the process go?" Coulton half whispered.

Dean shook his head. "I don't know. You may think me crazy, but it's my idea that *Coultonite* has become endowed with a peculiar life of its own; a metallic life, if you will."

Coulton gasped: "What?"

"It's the only explanation. After all, life need not by any strict rule of logic be limited to what we call organic compounds. Life can be defined as any unstable complex structure of which the chemical constituents are in a state of constant flux and which obeys certain laws of change, growth, and old age.

"The fact that life has never been associated with anything else but certain nitro-carbohydrates is no obstacle. *Evanium* is a created element; it never existed before in the universe so far as we know. It has certain lifelike qualities—change, disintegration, radiant emanations. In fact it went through its life-transformations with incredible speed.

"What we did was slow it up, make it more like the slow orderly processes we know. The other elements in the alloy act also as food for nutritional processes to be ingested and built into new growth combinations."

Dean listened again. Nothing from the outside; nothing but dead vast silence. The hollow of vibration was impinging on the walls now, and as it did so, the liquidity stopped and gave way once more to smooth rigid metal.

Coulton saw it and exclaimed joyfully: "We're saved!"

"Not yet. The shell in which we are inclosed is a stream of what I've named *triterons*—triple hydrogen with an immense positive charge. The revolving

magnets bend the stream into a hollow sphere. The *triterons* on contact with *evanium* neutralize its disintegrating qualities, combine with it to form stable, lifeless uranium. The trouble is I don't think I have enough power to force the shell outward so as to inclose the entire building."

But Coulton was content. At least he would be saved. Not that he was not sincerely sorry for the trapped tenants in the building. He was. It was simply a balancing of forces; his own safety outweighed too much consideration of others. With the thought came regained confidence. He even essayed a feeble replica of his booming laugh.

"*Coultonite* alive!" he chuckled. "What nonsense!"

DEAN ordinarily would not have answered. He was tired of his chief and his egoistic all-embracing selfishness. But unless he talked, his mind would be overwhelmed with the strained anguish of waiting—waiting—until the slow-receding bubble of force would reach other human lives. So he compelled his brain to calm theoretic considerations.

"Not only life," he said, "but more! Evolution! *Coultonite* is passing through a racial growth as well as a single life. Kaleidoscoped, compressed into short compass, accelerating in its effects. Even the processes of nitro-carbohydrate evolution have been imitated. That heralding crystalline clatter represents a mutation, a sudden rearrangement of molecules and planes into a new and different form. Perhaps we shall be privileged to witness the end-stage of metallic evolution before we know the ultimate of human maturity."

"Look!" Coulton whispered and went ashen-white.

The protecting globe of *triterons* seemed motionless now, without expansion. Where it had not impinged on

the walls, was no longer the strange liquid-solid. In its place was something else—what Dean was afterward to term the gas-solid form of metallic being.

The wall seemed to have opened up. It swarmed with movement—the movement of particles. The straining eye could discern interstices, spaces that shifted and closed in bewildering fluxion; yet limited as before by the definite boundaries of the wall. And hard, adamant to the touch.

BEYOND their circumscribed haven on the hundred and forty-ninth floor all was madness, indescribable confusion. Only a few fortunates close to the ground had been able to escape at that first warning clatter. Almost immediately the emanations from the life-emerging *Coultonite* had sealed every opening, every exit, with an invisible wall of radiations against which human flesh, human weapons, rebounded with perfect elasticity.

Within the confines of the building fifty thousand trapped beings struggled and prayed and cursed and shrieked, in accordance with their individual natures. Prominent citizens trampled their way ruthlessly over the weaker bodies of their neighbors in mad, fruitless rushes to a mythical safety; others, unknown to fame, performed feats of heroic sacrifice, ministered to the dying, shielded the weaker from the mob, comforted the frightened.

V.

OUTSIDE, New York was a shrieking bedlam. Sirens resounded, whistles screeched, horns made continuous raucous clamor. Every bit of fire apparatus within the metropolitan area, every emergency repair wagon, every ambulance, was being rushed to the scene of the disaster. The police roped off blocks around the doomed building. It was a very sensible precaution. The

National Guard was being hurriedly mobilized. The troops stationed on Governor's Island clattered up in motor lorries, trench-helmeted, equipped with bayoneted guns.

All the millions of New York, it seemed, crowded against the restraining ropes, the massed lines of police and soldiery. Central Park was a seething human flood. Frantic shouts burst in huge sky-splitting sound at each new change in the fated structure. There were hundreds of thousands in that crush who had friends, relatives, loved ones, in the terrible trap of the Coulton Building.

For it was from the outside, rather than to Dean's trained eyes, that the full and incredible evolution was completely manifest.

The gas-solid stage made of the tremendous tower a tenuous, insubstantial-seeming wraith. Yet the axes of the firemen blunted against the weave of particles, battering-rams rebounded with terrific force, and huge oxyacetylene flames made not the slightest impression on the impenetrable walls. The would-be rescuers kept on working, frantically, hopelessly. Even dynamite was used. The earth geysered, the roar of the mine rose high above the welter of sound, but the building was untouched.

A sudden gasp arose in gigantic exhalation from the multitude. The gas seemed to coalesce. It whirled round and round on invisible axes until it seemed like spiral nebulae. The thrusting flanks burst into flame, into a brightness so dazzling it blinded the eyes of the beholders.

The massed people fell back in a mad scramble for safety. Even the police, the grim sweaty fighters, ebbed away in quick fear. But there was no heat from that tremendous glare. It was "cold" light, the dream of all engineers.

The mutational stages were coming thick and fast now, so much so that for years controversy raged among the more

observant as to what had actually happened.

On the next, however, they were all agreed. A slow grinding sound welled from the structure. It was like the sliding of metal over metal. Then came a clashing as of brass cymbals. The strange sound rose in pitch; it became more plangent. A faint rhythmic sweep was discernible. The rhythm took on a sharply accented beat; the tones swelled in power until the entire universe seemed a diapason of harmony.

Music streamed in endless measures, pervading all things, swaying with supernal melody. It was heard in Washington, in Boston, as far off as Pittsburgh. Undreamed-of music of the spheres, yet imbued with strange metallic effects.

It was about the succeeding stages that the greatest and most rancorous disputes arose. There were those who claimed they saw curious unhuman shapes float through the dazzling structure of the building, shapes that were geometrical, angular in character, yet somehow conveying to bewildered minds the unmistakable expression of life.

Some even went so far as to maintain that these metallic forms were at first soaring, triumphant, wildly glad. Then they changed indefinitely; doubt pervaded them and gave way to fear, to horror, and to wild despair. A last, writhing, tortured movement, and they were gone. This of course was before the ultimate disaster.

But thousands, also present, and equally observant, derided these claims. They had seen nothing like these purported life-forms. Their antagonists, they insinuated, were using a tragic event to bolster up special theories, to undermine the very foundations of religion, and therefore, of the home, the State, things as they are, and the unselfishness of mother-love. For it was patent to all that if these pretended visions were true, then there was life be-

yond human ken, instinct in metals, minerals, sheer clods of dirt. And that way lay pantheism and godless atheism.

About the climax, however, both factions were in perfect agreement. Even as they watched, the huge flanks of the Coulton Building seemed to puff out a little, and—a great cry of horror arose from the straining multitude—the Coulton Building was as if it had never been.

One moment the soaring structure was a blaze of light, one hundred and fifty stories high, the next the air was clear, and the hitherto hidden silhouette of New York lifted its jagged edge against the sky.

Vanished, traceless, except for one thing—a gigantic bubble that fell headlong from the heavens and impinged soundlessly on the vast excavation where the foundations of the building had plunged deep into the ground.

A rushing wave passed over the city, an ethereal tidal wave that dissipated its load of free atoms, electrons, neutrons, what-not, over unimaginable areas.

The first indescribable confusion over, the first mad and understandable exodus from that terrible neighborhood ended, and rescue squads advanced cautiously toward the hole in the earth, still rubbing their eyes, expecting any moment to see the tower restored to its former position, to its old eternal solidity.

Deep down, hundreds of feet, they discerned a squirming, shrieking horde of antlike human beings. The rescuers went to work with a will.

SOME two thousand people were saved. Among them were Coulton and Dean, badly battered, shaken, but without serious injury. Dean's apparatus, delicate enough in all conscience, had been smashed beyond repair by the impact of that tremendous drop through space. Fortunately, however, it had functioned perfectly up to that very second, and had broken the fall of the bub-

ble of force sufficiently to save the lives of its captive humanity.

Dean, when the facts became known, was the hero of the nation. But he refused to be consoled. His sphere of protecting *triterons* had expanded too slowly. By the time of the final catastrophe it had inclosed only a half dozen floors. The rest, bearing with them almost fifty thousand human lives, puffed out in a stream of free particles.

The building, or rather, its metallic constituent, evolved too rapidly, Dean explained later. Its will-to-live was ex-

hausted by the driving energy of the activating *evanium*. Its period of existence had been comparable to thousands of generations of nitro-carbohydrate life.

It died finally, he said, of old age—of racial age, that is—even as the human race some day will sink into desuetude. In the case of *Coultonite* death meant the dispersion of its component parts. Perhaps, said Dean with a sad smile, the same might be the ultimate destiny of all our hopes and fears, our knowledge and our aspirations.

Don A. Stuart, the author of "Twilight," "Atomic Power," "The Machine," has almost overnight become an outstanding favorite of the readers of ASTOUNDING STORIES and made a lasting impression on science-fiction, to which he has contributed a refreshing new note. He illustrates perfectly the firm policy of the magazine—not only to present the best of the older favorites (several of whose names have never before appeared together in the pages of one magazine) but, whenever possible, to pump vigorous new blood into the field. And now Mr. Stuart comes forward with a story fit to rank with the unforgettable "Twilight." It is called PROMETHEUS, and it appears next month in ASTOUNDING STORIES. You must not miss it!

In Our Stride

This month it seems there is so much to say, and so little space in which to say it. Forgive me if the statements seem terse, will you?

Brass Tacks is shorter. Not permanently. The stories forced it. Every letter we received has been read thoughtfully, its message considered.

Considerable space has been given to letters which promise to give us the greatest debate of the year. They center about Van Campen's "The Irrelevant," and contest a point which has baffled physicists: "Has the Law of Conservation of Energy been disproved?"

Month after next we present a new writer, J. George Frederick, beginning a two-part story, "The Einstein Express." This story is destined to go down as one of the classics of science-fiction. He is not, perhaps, the complete master of style that John W. Campbell, Jr., is—but his theories justify the term "thought-variant."

And now, looking over the list of the great, we've brought Dr. E. E. Smith and J. W. Campbell, Jr., into Astounding together. But there is one other outstanding master. It's too early to be positive—but I hope to have him with us in the May issue. Perhaps next month I can be sure.

If we get this story we will say that we have sorted the worthwhile material and saved only the brightest of the stars.

You and I have traveled a long road together since a year ago last October, and I think that I am justified in feeling that we have not stumbled once on the long climb. We're not even in sight of the top yet and I hope we shall not glimpse the peak this year or next. There is too much yet to be done in science-fiction. We have so many byways of thought to explore! It's appalling when you think how editors could pass them by for years. We're going to explore them all, you and I, until we know where every last one leads us, and it's going to take us a long time with every minute packed with interest.

We must continue to grow in numbers this year if we are to support our ambitious program. Remember that we ask you for less than other science-fiction magazines—and we pay our authors promptly and well. This makes the burden our mutual problem. We give you the biggest magazine, with the best authors, for the least money. You in turn must give us the biggest audience. That's fair, isn't it?

If I seem to urge you, please remember that I do so in order to justify our program to our publishers, and to ourselves. I expect our family circle to expand this year even more rapidly than it did last. And if it does our progressive program is assured.

—The Editor.



A thing breath-taking, awe-inspiring—horrible. It towered a full three hundred feet.

The Mightiest Machine

Part Three of the epic novel

by **JOHN W. CAMPBELL, JR.**

Illustrated by Elliot Dold

UP TO NOW:

Aarn Munro, Jupiter-born son of Earth-colonists, was the research director of the Spencer Rocket Co., Russ Spencer, the president and owner, the grandson of the founder of the company, and Don Carlisle was the director of chemical research for the Spencer company.

Aarn made three great discoveries, incorporated them in a single ship, the Sunbeam, which the Spencer company built.

The three men, with two assistants, started out on a test flight—and collided with a great asteroid. The ship had been going forty thousand miles a second when it struck, and it was protected by three layers of force—the magnetic atmosphere, the antigravity field, and the momentum waves.

The power of the ship was stolen from the mightiest machine that ever was—a sun of space—and it was stored aboard in great antigravity field coils, the "aggie" coils. The transpon beam, a conducting beam that could tap a sun for power, made this possible, and the momentum waves drove and maintained the ship in space, a discovery Aarn had made from a development of the wave theory of the atom.

With the stored power of a sun to defend it, and the titanic mass of the asteroid attacking it—space could not stand the strain. The fabric of space

rent about them, they were hurled out of four-dimensional space into the fifth dimensional interspace.

They were not the first of humans to suffer this. They awoke to find themselves in another four-dimensional space, a space of titanic supergiant suns, near a sun mighty beyond comprehension—one hundred million times as brilliant as our Sun, Anrel shone fiercely hot on them when they woke, at a distance of 1,000,000,000,000 miles. Thousands of terrific, brilliant suns made all the heavens bright.

And they were attacked almost instantly by a destroyer-class space ship of the Tefflans. With their great power coils pouring power out, instead of taking it in, they burned down the great metal walls of the first ships, which fled, but later returned to the temporarily helpless Sunbeam with a great battleship-class machine. The Sunbeam was saved by the arrival of a patrol detachment of Magyan warships, which drove off the Tefflan attackers.

From them Aarn learned that he was not the first of humans to be thrown through the spaces. On the Continent of Mu, the Magyans had developed on Earth, warring with a strange race of beings, the ancient Tefh-hellani, who lived in the vast caverns under Mu. In a last effort to destroy them, the Emperor Tsoo-Ahs of Mu first established some colonies all over Earth, built space ships capable of opening the caverns to

the sea—water rushed in—and Mu sank forever.

But a single ship of the Teff-hellani escaped, destroyed all but one of the Magyan ships, and, in a vicious running battle with it, both collided with a planetoid and were thrown through to this strange space. Since, both the Teff-hellani, a people half human, half goatlike, and the human Magyans had continued the war of instinctive hatred.

Aarn found himself hating the Teff-hellani instinctively and joined with the Magyans in an effort to end the fifty-thousand-year-long warfare.

Further, the ancient Data Plates, worked out by the captain of that first Magyan ship thrown through, was the only means Aarn had to regain their own space, and the Teff-hellani captured it ages ago. Aarn must recapture it.

In this vast system, Aarn could not make his sun-tapping beam reach across to the sun in less than weeks, but, thanks to his interdimensional experience, he found a way to project himself out of four-dimensional space and return at any other point at will, thus effecting the result of velocity greater than light.

Further, by converting electromagnetic-light energy to gravitomagnetic-wave energy, he could make his ship transparent, and so was able to reach the mighty Anrel and collect power from it.

With Anto Rayl, their new-found Magyan friend, they returned to Magya, the home planet of the human race in this system, and saw the Magyan fleet. Each battleship, of which there were less than one hundred, was made with four-foot-armor walls; every few feet it was divided with huge armor bulkheads; and it was equipped with accumulators which made it possible to store energy everywhere.

The ships could not be sunk, for there was nothing to sink them in, and, cut in half, they were merely two ene-

mies instead of one. They were almost indestructible. Even the light cruisers were terrible, swift-moving forts, impregnable to all but the heaviest guns and torpedoes, or ball-lightning discharges.

The Magyans' greatest weapons were ball lightning and Shal torpedoes, which, by a slow, continuous, supersonic explosion, drove their way through everything, crumbling it to dust.

X.

WE HAVE," said Carlisle with annoyance, "been here now for forty-seven of their long days, and we seem to have got nowhere. The Tefflans have, on the other hand, conducted a successful raid in which three heavy cruisers and a warship were destroyed with the loss of two light cruisers, and a damaged battleship."

Spencer smiled wanly. "Brother Trolley Car, what you need is work. You've been wandering around San Toa here like a lost soul and doing nothing."

"What could I do?" demanded Carlisle angrily. "That's what gets me. I'm not used to loafing. I couldn't even help particularly when you ripped the old Sunbeam to pieces and made her over. The only thing that's left I know anything about is the kitchen and the air apparatus. You tore out the lab, the calculating room, the lounge, most of the quarters, and loaded in more accumulator coils. Then you crowded so darned much junk in that power room I don't know what all is there. I know you have a lightning apparatus—but what else have you?"

Aarn smiled smugly. "Much the same in the other three fields. Ball lightning is an electric field of one sign that is self-maintaining because its intensity is so great it simply wraps itself into a pocket in space. As soon

as any great intensity of another field enters it, it unwraps—and then look out.

"The ball lightning has one difficulty; it always goes bang at the surface of the thing it touches. So I tried ball-magnetic field. We got that. That has the advantage of—well, look. I even made a rifelike model for the spy ships to carry."

Aarn's "rifelike" model must have weighed one hundred and fifty pounds, but the Jovian handled it with ease. He led Carlisle out of their quarters down through the laboratory that had been taken from the *Sunbeam* and set up in one of the bright-lighted chambers the Magyan had hewn in the solid rock of the planet with the aid of the wonderful Shal torpedoes.

At the far end of the laboratory were several heavy sheets of armor plate, steel twelve inches thick, so heavy that they were more nearly described as blocks than as sheets. Yet the great battleships carried this plate as light inner-hull armor, while blocks four feet thick made the outer hull.

"Now remember: This fires a magnetic-ball field. It will proceed to set itself inside that magnetic material, and then release its energy. An electric-ball field tends to spread itself on the surface and release. A gravitational field is even better, since it seeks the center of gravity of the body and then releases. But a little spy ship is so light it has no effective center of gravity of its own. The battleships and cruisers are the fellows those will go after."

Aarn raised the strangely shaped weapon and pressed the trigger release. There was a thud somewhere inside, then a steady stream of strangely glowing orange balls shot out of the muzzle and curved gently to one side as they sped across the room. They struck the heavy metal, though, because they jerked sharply out of their course toward it. The first struck and was buried in the metal.

Instantly an explosion occurred inside the metal that made a three-inch blister on the surface. The next was a little to one side and arrived perhaps a hundredth of a second later. A third followed, and a fourth. The result of several hundred of these ball fields was a suddenly opening cleft of white-hot iron that tore the heavy armor in two instantly.

"That," explained Aarn, "is the general idea."

"Will it do the same on the heavy stuff the battleships carry?" asked Carlisle.

"Well—not quite so well. The big ships carry such thick armor it will dissipate the energy almost as fast as we can get it there, with the result that the thing has to eat its way gradually through, and can't, because the ship moves. I'll admit the Shal torpedoes have their points. We're improving those, by the way, by putting magnetic grips on them that will pull them on as long as there's anything stopping them."

"Hm-m-m—I have an idea. I wonder if there are any chemists around here," said Carlisle softly. "I'm going to have a talk with Mayno Shar."

Carlisle wandered off in a sudden dense fog of thought. Spencer stared after him in amazement, and a broad grin spread across Aarn's face.

"Well, and that's that," said Spencer.

"He's got an idea, and when he gets one that hard, one's all he can handle." Munro grinned. "I'd like to know what it is, though."

THEY learned a few hours later, when Carlisle and Mayno Shar came back together, talking earnestly. They wanted aluminum. And they wanted iron oxide, and magnesium, and a magnetic-field-ball device.

Aarn had to help them, but he was as interested as they, by the thing they turned out finally—a round bomb of thick graphite, filled with a charge of

iron oxide and aluminum powder, with a detonator attachment, and a projector that would project it by means of a spring catapult. Compressed air would have had less tendency to injure the bomb, but the gas would be difficult to obtain and require heavy equipment to carry it in space.

They tried the finished bomb, some four feet in diameter, on an old piece of battleship-armor plate the next day. From a projector tube placed on the side of a destroyer, the bomb was held.

The physical mechanism functioned perfectly. Though the armor plate was being jerked about by another destroyer, and though equipped with even a repulsive space disk, the bomb found its hold and clung.

For ten seconds nothing happened. Then a red light suddenly glowed over the bomb, it turned white—and simultaneously a terrible pencil of blinding blue-white radiance sputtered out of a one-inch hole in the side of the bomb that touched the plate of metal.

That one-inch stream fused the metal as suddenly as a stream of boiling water would fuse a cake of ice. It ate holes in the armor as it slowly spun around, and within one minute the terrible blinding stream of white-hot, boiling iron and aluminum shot through the armor and on into space, squirting out under the pressure of the vaporous iron inside the now white-hot graphite bomb.

No other substance known could have resisted the terrific heat, and, though mechanically weak, graphite had served.

Had that armor plate been part of a vessel, a gaping hole would have been cut, through which the air would have escaped. Then that incredibly fierce flame of melted, boiling iron would have squirted over whatsoever might lie behind.

"I thought of that," said Carlisle with satisfaction, "because of an experiment I once saw as a demonstration of thermite. The lecturer had a crucible of

iron with the thermite mixture suspended over a vertical series of ten other iron crucibles, and finally a pan of sand. He started the thermite, and a drop of that incredibly hot iron fused its way through the bottom of the first crucible, and then *plink-plink-plink-plink-plink*—right through every single one of those other iron crucibles, and ended up by fusing some of that sand to glass.

"You know, it is almost unthinkable—the effect of having a real quantity of matter at a temperature like that."

"It is," admitted Aarn. "I never really respected the power of chemistry so much. That's a real for sure heat ray. Physics couldn't make one, but when you turn your little hose loose and——"

"I wonder," suggested Spencer, "if we couldn't do just that—use a hose?"

"No," replied Aarn quickly. "The white-hot stuff would cool too quickly—cool before it reached its target."

"No," said Carlisle simultaneously, "because the graphite would evaporate and burn somewhat with each firing. The crucible would have to be replaced, and you couldn't make anything to hold the holder. The crucible gets so hot you couldn't hold it, remember."

"I want to ride in that new battleship when they finish it," said Spencer.

"It's a beautiful thing," agreed Aarn, "but remember that nothing is absolutely immune to attack. It's conceivable that the Tefflans might develop some new weapon that would destroy it instantly. That thermite trick would certainly make it look sick if it ever got through the magnetic atmosphere."

"But with the things it's got—the gravity-field ball, magnetic-field balls, besides electric, the magnetic atmosphere, that interference device to stop the radio-frequency induction, the aggie coils for power—even momentum wave drive, and the faster-than-light escape,

if necessary. "You couldn't touch it!" Spencer scoffed.

"No, listen: Nothing man ever made was beyond man's power of destruction," snapped Aarn. "I could destroy that battleship with the little *Sunbeam*. Suppose I attached about fifty of those thermite leeches of Carlisle's. You couldn't escape them by running away, because they'd just dig in their magnetic toes and hang on.

"Add that I smashed an unexpected transpon beam loaded with everything those big aggie banks we now carry could give, and headed it straight for their own main aggie-coil bank. I'd have them underpowered in a fraction of a second. Their faster-than-light escape wouldn't work, their armor would be full of holes, and the ship full of white-hot iron spray.

"A few gravity-ball fields would settle down comfortably somewhere in the neighborhood of the main antigravity coils and blow them to kingdom come. The point being that I could, with a sudden attack of unexpected ferocity, cripple the thing so it couldn't run before it could get started. Then everything else in sight could pile on—and good-by "Ma-jhay-anhy!"

"But the Tefflans have no *Sunbeam*," protested Carlisle.

"They haven't been idle—and they know that they're in for some new kind of trouble," replied Spencer. "I see Aarn's point."

"WHAT are the plans of the Magyans in regard to further battles?" asked Carlisle.

"Anto Rayl said—that they wanted to finish another squadron of the aggie-supply ships and set up heavier defenses on the four moons here. Then they plan to launch a grand attack on Teff-el and simply wipe it out. The present plan, for one thing, involves the use of Teff-el's moon, Teff-ran. Teff-el has only one moon, and it's about three hun-

dred miles in diameter. They plan to capture it—and use it for ammunition to destroy completely Teff-el!"

"Sweet wavering worlds! How could they?" gasped Carlisle.

"Not impossible now," Aarn said earnestly and eagerly. "They thought of using antigravity coils and freeing it of Teff-el's attraction; but I convinced them that they'd be wasting a lot of power loosening Anrel's greater attraction, so they simply plan to attach a huge system of momentum-wave engines and drive straight into the planet with all the energy they possibly can. That's one reason for the extra fleet of supply ships. Those aggie ships will be regular mobile aggie coils, and not much more. About one million tons of aggie coil."

The soft musical hum of the door annunciator sounded, and presently Aarn returned with Anto Rayl in tow—and highly excited.

"A scout ship just came back—they've been circling Teff-el for the last twenty days at a speed so great that no photographic plate could catch them, and painted so black no eye could see them—and the men report a huge war formation is leaving. That means an attack in full force."

"That means something else—they've got something distinctly new to fight with, and they hope they can do so much damage to you right now that you won't be able to use the things that the *Sunbeam* had. They know that you have the secrets we had, and they know that small ship was invulnerable to the attacks of their largest and heaviest. If they are picking a fight now, that means something new and deadly. Send one of the new destroyers out to attack, and have a fleet of the new scouts near by to watch. We'll go, and you can meet us at the *Sunbeam*, Anto Rayl."

"That is the plan," said Anto Rayl smoothly, "formulated by the High Command."

Anto laughed slightly, bitterly, and went on: "Do not think we have been fighting these Tefflans for centuries without learning their every thought. We are worried, I may say, for they know ours."

XI.

THE GUARD fleet stationed near Magya itself had dropped far behind now, and the formation of the fleet was perfect as it swept up and on into space. A disk of scout ships was flung wide ahead, with the occasional new scout ships of the type capable of faster-than-light speeds scattered as messengers.

Behind this warning disk, ten thousand miles behind, came the fleet, a huge sphere of restlessly weaving destroyers, an inner sphere of cruisers, both light and heavy, and then the solid might of the great battleships.

In the forefront of the battleships was the *Sunbeam*, her occupants watching interestedly the views on the television, relayed from the leading destroyer. A tiny cloud of dust in space far ahead represented the attacking Tefflan fleet, hurling itself forward to the battle eagerly. Telescopes were trained on them from the scout ships ahead, and suddenly half a dozen scout ships vanished from their places, to appear beside the battleships of the Magyans.

Despite all rules of space warfare, the Tefflans were sending their heaviest battleships ahead, in the lead, with the heavy cruisers reinforcing them. There were ten of the heaviest ships and all very evidently new. And the cruisers were all equipped with new apparatus, something the trained eyes of the Magyans had detected instantly.

Two great Magyan battleships suddenly leaped forward, speeded, and vanished in speed greater than that of light. They were to be sacrifice ships if necessary, but those two giant ships out of Magya's active fleet of thirty-six were deadly machines.

Their own fleet dropped swiftly behind and then vanished to them, while the fleet ahead shifted and shimmered in the strange effects of their speed. They swooped nearer, then, suddenly, were almost among the leading Tefflan ships—and appeared. The Tefflans had had no warning, for none could race through space faster than light, and the warning the Magyans might have given trailed somewhere behind.

For thirty seconds the Magyan battleships operated with every piece of offensive apparatus they possessed. A thousand giant thermite bombs spattered out of each, to seek and hold a place on some enemy ship. Thousands of terrific magnetic balls shot forth, to bury their fangs in the armor of some cruiser, and rip a great gap in it; to heat the armor of some battleship yellow, hot, and soft. Sudden terrific explosions must have echoed deep within cruiser and battleship as gravity-field balls sank, reached the center, and blasted their energy in the heart of the ship.

And each great battleship was slicing about with six transpon beams, not such as that the *Sunbeam* had used, but run by far vaster power coils. They cut through a cruiser's armor instantly and sliced it cleanly in two. They burned and sputtered at a mighty battleship's armor, and cut and bored through to the heart of the ship. Shal torpedoes lurched and ground and shuddered their way into weakened armor, and great white-hot holes appeared where thermite sprays ate their way through.

So sudden and terrific was the attack that the cruiser force was nigh destroyed before any realization of the presence of an enemy was possible.

Destroyed—but not destroyed. For though the cruisers were sliced by the transpon beams, their armor pierced by thermite and magnetic bombs, their hearts blasted by gravity-energy bombs, they were carefully designed to with-

stand and operate under any conceivable punishment, and the Tefflans had designed well.

The ten great battleships were crippled, their walls punctured by the thermite, twisted and softened by magnetic bombs, their deepest center torn and blasted by gravity bombs, but their engines might be wrecked and leave them by far the greater part of their energy—the wide-scattered accumulators.

Shells were flying from the battleships and the cruisers, torpedoes—but they turned aside and exploded far from the Magyan ships. Great induction beams snapped out—and died a flaming death on the screens of interference that Magyan ships had been equipped with for fifty millia.

THEN every man in the fore part of the great Magyan battleship *Hantu Toa* stiffened suddenly at his post, and writhed and twisted in sudden grating, grinding agony, his nerves shivered and shuddered, his uncontrollable muscles jerked and snapped about, his eyes grew dim, and his hearing ceased. Meaningless shouts of uncontrolled sound burst from them, and they toppled—dead.

Slowly, inexorably, the thing crept backward—and another wave started at the stern and worked forward. A mad hand touched something—the great mass of steel hurtled forward at thousands of miles a second, suddenly driven into another space, and swiftly gaining velocity. It tangled, somehow, with the electric fields in the accumulators of a Tefflan ship, and both vanished in an intolerable blaze of energy.

The *Anlan Toa* suddenly turned and vanished in speed greater than light. The unknown secret was known. For the fore part of the *Anlan Toa* had been touched, and men had jerked and bellowed and died. The Magyan fleet had halted and hung motionless now, waiting. Swiftly a dozen scientists entered the *Anlan Toa* and looked. They

had the answer in seconds. A few glances—

"Coagulated," said Carlisle as he saw the tissue of the dead men.

"And I know how. Super-sonic waves," Aarn put in softly. "They induce them somehow in our ships. How in—got it, I think. Make us do it. It's the radio-frequency induction beam heterodyning our own defense interference somehow into super-sonics."

"Then if we turned off our own interference that would prevent these deaths?" asked a Magyan somewhat doubtfully.

"I think so. Send a destroyer—let them try that. One of the new ones, lest torpedoes or other weapons destroy it," suggested Aarn eagerly.

A destroyer vanished as it shot ahead, a destroyer equipped with momentum-wave drive, magnetic atmosphere, the transpon beams, and powered by aggie coils.

They watched it by television screens relayed from tiny spy ships up there on the front. They saw the destroyer appear suddenly, spray a collection of the deadly thermite bombs that clung and burned and ate. Magnetic-ball fields, gravitational-ball fields shot out. Torpedoes. A transpon beam that sputtered through the armor of half a cruiser that was as active as ever the whole had been.

For seconds the destroyer continued operating, a sputtering transpon beam driving its white-hot needle to the heart of a great battleship now, slicing through accumulator banks. The battleship suddenly began to blossom with blue-white spots of eating thermite spray. The deadly stuff was spewing out in a dozen two-inch streams. The destroyer released a new flock of torpedoes—

And its outlines softened gradually, and it spread, as though the disintegration process of time, of a billion billion years, had been encompassed in a dozen

seconds. Then it suddenly puffed gigantic, a dust cloud, through which still burning lights showed, but vanished suddenly, with sudden flaming, sputtering transpon beams that fought and stabbed, and blew up huge stores of aggie energy.

The little spy ship that bore the television suddenly reeled and quivered under the released field impulses.

But the destroyer was gone.

The Magyan turned to Munro, his face white.

Munro was staring ahead in horror, in terrified bewilderment. "Disintegration—they disintegrated it!" he gasped. Slowly he passed his hand across his eyes, and a look of deep puzzlement came. "But—they could not do that. It's—it's impossible!"

"They did it!" snapped the Magyan.

"They didn't. They only seem to have," replied Aarn half consciously. He was thinking: "We're going aboard the *Sunbeam*."

The solarites went back to their ship. And Aarn was silent as he looked ahead.

"I think—I know——"

His fingers flew as he set up a dozen controls. Then he pressed one. The fleet around them vanished. They were diving headlong through the mass of broken and damaged Tefflan ships. On—on—to the main mass of the great battle fleet.

In the exact center of the battle fleet Aarn stopped. "We are," he said, "invisible. I have left a small hole so that the television eyes can see. They know we are here and presently will, I suspect, begin doing something about it.

"I'm going to open up this shell of mine—no; I won't have to—yes; I will. I'll open up, and send them a flaming invitation to battle in the form of all our thermite bombs, and our best wishes wrapped up in ball-gravity fields. Carlisle, you handle the thermite. I'll handle the ship. Spencer, take the gravity."

They saw little change, but at Aarn's signal they began to work. It was rapid, for the *Sunbeam* spun quickly on her axis. Aarn had added the transpon beam, and cut a terrible swath of white-hot destruction through half a dozen destroyers that had come in to the battleship squadron to see what was the cause of the terrific field disturbances.

"One"—said Aarn—"you have five—three—four—gone. The field's shut. Watch!"

THE THERMITE bombs were seeking anchorage. The gravity bombs found victim after victim, a flash of lurid light, a few score exploding ports, and a sudden wild movement of the struck ship as the lights going out momentarily told of that.

The thermite bombs took hold. A score of them had been released from the twin tubes, and now a score of ships felt the blistering two-inch stream of white-hot iron.

The television apparatus abruptly went dead. There was a tinkling and whistling—and then Aarn grinned as it stopped.

"I thought that would stop it."

In answer to Aarn's contented expression, there was a sudden terrific scream of tortured metal, a flash of terrific light from somewhere behind them, then the clang of automatic doors shutting. Aarn blanched, and there was the whine and thump of heavy transpon beams in action. He ran silently for several seconds, then shutters moved from the windows. They were in empty space.

"I neglected to consider those things. That explosion, that seems to have dented in the rear portion of our hull, was caused by one of those ball-lightning discharges. It simply was sucked into the field that stopped the light, and that field was so tight, the ball lightning touched our shell. Now, I can't

make an invisibility device work, because they can find it.

"That death ray killed off the crew of those ships—that's heterodyne with the radio-frequency beam. They have something else—something carrying millions of horse power. Must have some wonderful apparatus to do it. It's—a fatigue ray. It does exactly what those Shal torpedoes do, only does it along a beam. It doesn't break by its energy. It doesn't fuse. It simply crumbles things. I got an analysis on it from those controls I set up.

"They had it arranged for the best values on iron and steel. We have beryllo-aluminum walls largely. The thing didn't get that right off. You see steel is made up largely of crystals, and while a pretty good conductor, those crystals can have a distinct difference of potential across their faces. And there is a sort of insulation between each.

"They have a radio-frequency beam of some sort that simply starts pounding the individual crystals of steel, and all those that happen to lie on just about the right frequency start vibrating in tune—and all of a sudden they break and turn to the finest sort of liquid dust. The strength goes out of the stuff and leaves the most useless sort of granular, rotten metal. Fatigue. Too much pounding. They pound it a couple of million times a second and give it a million years' natural fatigue in a second.

"Now here's the pleasant situation. If we keep up the radio-frequency interference screen, the disintegrating beam is stopped. If we do keep it up, though, they start their heterodyning stunt, which is probably done with the same beam, and kill all the men. If we take it down to save the men—they crumble the ship."

"Then what can we do, Aarn?" demanded Anto Rayl.

"Fight!" replied Aarn grimly. "It's a terrible blow to learn this—but think

also that they are suffering, because they thought to disintegrate your ships safely from a distance. They won't. That's your consolation."

Anto Rayl made a wry mouth. "It is sour consolation."

THE TELEVISION screen came back to life as Martin and Canning finished their repairs. Canning reported that the damage caused by the explosion amounted to seven destroyed aggie coils, and three plates fused away. No great damage had been done, really, but it might have finished the trip.

"We will tell your people," said Aarn, as the Magyan fleet suddenly appeared on the television screen, "and they must fight. That is all I can offer now. Their best method will be to release their bombs, far, wide, and handsome, in the knowledge that no bombs can endanger their own ships, while every bomb that wanders loose is an additional danger to every Tefflan ship. Tell them, too, to try using the screen and dropping it rapidly—alternating, say, anywhere from one to ten times a second, and hope for a good effect."

The battleships were well behind now, as the fleets neared each other, and at the suggestion of a Magyan scientist, the entire fleet of momentum-drive equipped ships suddenly acquired the greatest possible momentum, released all the bombs available, then fell back with the rest of the fleet. More bombs were acquired from the supply ships, as the Tefflan fleet maneuvered more slowly into position.

The bombs struck without warning. They had been moving at terrific speed, and they swept in, in a solid front. At a thousand miles they began to illuminate Tefflan hulls, splashes of blinding radiation.

The great battleships of the Tefflan fleet were almost indestructible, but before the terrible lashing attack of thousands of thermite bombs, the searing

flame of the transpon beams, and the crippling attack of the gravity bombs, even the greatest might be beaten down.

The cruisers, the destroyers, and the lighter craft vanished under the attack of swift-darting spy ships and scouts. Here, for the first time, the scout ship became a prime instrument of war, for, loaded with aggie coils, and equipped with the invisible transpon beams, they were so tiny as they darted about, without lights and black in black space, that they could actually wander in among the cruisers and destroyers of the enemy, and with their deadly transpon beams, they were capable of ripping a destroyer open.

The Tefflan destroyers carried disintegrating, or fatigue-ray apparatus, but not powerful enough to operate against anything larger than a scout ship, and the scout ships were far speedier, far harder to find. The Tefflan destroyers retired in haste, and were wiped out completely by scout ships they could not locate.

Their own scout and spy ships were destroyed utterly by the little two-man spy ships of the Magyan forces. Equipped with aggie coils and momentum drive, the one thousand new spy ships could maneuver far more swiftly. The torpedoes and shells of the enemy were useless, as the magnetic atmosphere stopped them, and the scout ships of Tefflan carried no death ray or fatigue ray.

The battle was fought at long range, by mutual consent. Tefflan lost her destroyers, her spy and scout ships. What destroyers were not accounted for by the hundreds of thermite bombs, or by a well-placed gravity or magnetic bomb, or ripped open by a transpon beam, escaped under the sacrificial cloud of scout and spy ships.

But the great cruisers, and even the light cruisers, were proof against the scout ships, and the battleships were not even annoyed by them. The light cruis-

ers made it their duty to seek out and destroy the somewhat dangerous scout ships. Their armor would glow and sputter under the combined attack of four or five transpon beams, a cloud of gas would be released to make the beam visible, and then a fatigue ray would shoot back along it.

The main battle, though, was between the battleships of each side, for Magyan battleships could stand a short exposure to the fatigue ray. No damage was done until the actual weakening suddenly and spontaneously occurred. It was a process of building up molecular-crystal vibrations till the crystals finally snapped, and until that point was reached there was no damage. Then there was all damage.

The enormous mass of a battleship wall absorbed a tremendous amount of energy, and only when several beams got in perfect phase was the result quick.

Too, by using the screen for a brief part of a second, the interruption, coming once every hundredth of a second, was able to weaken the effect, as the vibrations damped out in the protected period, and the exposure meant only a mild, steady torture to the men within the ship.

THIRTY great battleships formed the front, against twenty-nine whole Tefflan battleships, but there were no less than eleven half ships in action, and each of these was fully half as deadly as a full battleship.

The Tefflan beams reached out—but weakened by distance. Similarly, the deadly transpon beams were weakened in distance. But the transpon beams could heat the great battleships slowly, if they held, and that meant unbearable conditions within. The trouble lay in the fact that the men aboard the Magyan ships were tortured with jerking muscles as the super-sonic waves struck them, just mildly, but enough to make their control poor, their aim bad.

The *Sunbeam* hung far back. She had no walls thick and strong enough to withstand even a momentary attack of the beam if applied on the right frequency. Instead, she was occupying herself in sending bombs.

"I think," Aarn said softly, "this battle will go to Magya. I think it is certain to. It would have gone to Tefflan, but that the destroyers and cruisers of each fleet are almost worthless, and the Tefflan commanders realize that the battleships could never pass the heavy defenses on the four moons and on Magya itself. And the cruisers can't help now."

"What good are these bombs doing?" asked Spencer in exasperation. "Can't we make another flying attack in there and get out before they spot us?"

"They've spotted us right now. They probably know just where we are, and the instant we disappeared, their observers would be watching for us back among 'em. They'd have us floating in a sea of electric flame before we stopped moving," Munro said precisely.

"Further, these bombs are doing a lot of good. They are disconcerting. The Tefflans' generals and scientists may have figured out how it is done, but that's less comfort to them than the knowledge of the general idea of that death ray is to us. We can do something about that, but they can't stop these things. And these have no distance limit.

"The center of every single one of those battleships and cruisers up there is an exploding, white-hot danger point. Not one of those ships has any heart left. The engine room is gone, and, probably, half the reserve apparatus, the commanding officer, and the main controls. The big thing is—those ships have no source of power."

"Say, if those gentle little toys have no source of power," Carlisle said bitterly, "I'd like to see one *with* a source of power."

"They are drawing on accumulated power. Heck of a difference!" said Munro. "The accumulators are exhaustible. If the thing keeps up indefinitely, they'll be sunk, because they can't get home without power, and— Sweet stellar spectra! That's a thought!"

Aarn turned the *Sunbeam* suddenly, applied all his power, and headed for Magya. They leaped to the planet faster than light. In swift syllables he explained to Anto Rayl, and when they slowed to less than the speed of light over San Toa, Anto signaled for the opening of the great gateway.

Again the clouding steam, and again they sank into the island. With familiarity, Aarn hurled the *Sunbeam* at a reckless pace through the tunnel and into the hangar which was hers. He was out of the ship and into his laboratory in great leaping bounces, the bounces of a Jovian on a lighter world, and in a hurry.

Spencer was after him, calling Canning to accompany him. Aarn was already at work on the calculating machine, and with a great loose-leaf notebook filled with fine-lettered data. Minutes sped by into hours as Aarn labored.

Information was brought in from the battle front. Conditions remained almost the same now, balanced, though one of the Magyan battleships had failed in her fore quarters and collapsed utterly. She was turned about now and still functioning while most of the light cruisers of the Tefflan forces had left the front and retired far behind the lines, out of range of the aiming powers of the various bombs. The scout ships were still tearing at them, however.

And one Tefflan battleship half was out of action and limping home.

TWO HOURS passed, and at last Aarn had what he wanted. In half an

hour he had designed a mechanism to do the work. In an hour more Canning had turned it into three different types of patterns.

Scout ships came in from the fleet some three hours later to pick up newly made apparatus. The things were crude—simple.

The messages that had come to Magya had been equaled in number by the messages going out. And some of those had gone from the great headquarters on Magya. The result had been a steady retreat, the sacrifice of two old-type destroyers, with radio control operated over mile-long cables. Tefflan seemed to be winning. Six great battleships had fallen back and were evidently undergoing repair, the supply ships clustering near them.

Tefflan ships advanced. But presently, about the time the scout ships began racing out to the fleet with the new apparatus, they became worried and started retreating rapidly themselves.

Magya followed just as rapidly, at a distance. Tefflan ships retreated more rapidly, and some of the cruisers which had retired came up and battled bravely. But uselessly, for they were drowned in great transpon beams, as one huge battleship after another leaped close and retired before seriously weakened.

The battleships of Tefflan were in frank retreat, but the Magyans held on like leeches, attacking vigorously, and the Tefflans realized in dismay that their opponents would not leave them. In haste, the Tefflans raced for the protection of the great defenses on the planet, the one moon of Tef-el, and the ten orbital forts they had set up.

And one by one the great Magyan battleships started their new apparatus as it was installed. Crude—not very effective—but the momentum-wave field was distorted and twisted, till it gripped the Tefflan ships. Like a gigantic hand, it clutched them and slowed them. The six battleships that had fallen behind

came up now, nearer than before, then held back also.

Frantically the Tefflan commanders turned their waning power into the drive, while cruisers attacked desperately to free the greater ships. Grimly the Magyan battle fleet held on and rained terrific magnetic field bombs on the cruisers, that warped and twisted and fused their frames and their armor, and the Shal torpedoes ate their way in.

There were no more thermite bombs, but the gravity bombs and magnetic bombs were being supplied now largely from the six ships which had retired to the supply ships and had all their power coils recharged. The gravitational balls were wasting their energy in a compartment they had blasted to gas and molten waste.

The accumulators which had been centered here were gone, along with the engines. The Tefflan captains saw their power declining—the last dregs of energy slipping away.

Huge fatigue rays drove at the now-close Magyan ships, and the armor and frames began to crumble slowly—slowly. The ships fell back abruptly. Those ships were deserted, too weak now, and radio-controlled. Their momentum drives pulled back, and the Tefflan ships pulled on. Their beams were wasted once more in disintegrating the huge masses of those four old hulks.

After that, they had no hope. Their power was so far gone, to attempt to destroy more ships meant complete loss of the entire fleet. The Magyan ships closed in. Heavy cruisers of the Magyan fleet closed in—

Bright transpon beams sectioned the Tefflan hulks neatly and with dispatch a few thousand miles beyond the ultimate range of the orbital forts and the planetary defense beams. The battleships were sectioned, and each ship of the Magyan fleet took a piece in tow according to its power.

The cruisers were sectioned where they had been destroyed further in space, and the five-hundred-million-mile trip back to Magya begun.

Teff-el was, for the first time in centuries, totally without a battle fleet, and yet the Magyan ships did not dare to approach. For those orbital forts were as invulnerable to a battleship as a battleship might be to a one-man spy ship without weapons.

And, further, Magya received back, of its thirty-six brave battleships, seventeen. A battle between battleships of space is not like a sea battle, for the battleship of space never sinks, and every portion is capable of fighting until every man within is killed; a battle between space battleships is to the death of every individual. When space battleships were destroyed, they were annihilated completely. Only the millions of tons of refined steel that the Magyans were towing back remained.

There was no hope of learning the secret of the death beams and the fatigue ray, for the apparatus had been fused completely by a built-in accumulator. A touch of an emergency button, the release of all air pressure on a special valve—and the apparatus was reduced to scrap.

So, though Tefflan contributed millions of tons of steel to the new battle fleet, they contributed no knowledge.

XII.

AARN was worried as he rejoined his friends after the conference.

Spencer looked at him questioningly. "Couldn't make anything out of the wreckage?"

"No," replied Aarn; "but that's not what's worrying me. That's a minor point. We don't need that, with the latest plan. I suggested it, and I got us into trouble. Quite rightly, and with every reason, the Magyans are wild for it. They gave a great whoop of joy

and fell on my weakened frame from all sides, but——"

"What," asked Spencer, annoyed, "caused this demonstration of joy? What was the inspiration?"

"Eh—oh! The moon-ship idea. You know—need something heavier to stand up against that new beam. Simple idea—fairly obvious, isn't it?"

"Again, nit-wit, what? I can't get what you mean by a 'moon ship'; they've had ships to go to moons and beyond for millia on millia."

"Oh, I mean the whole moon. They have four. They want to use two in the plan—Ma-ran and Ma-kanee. That's numbers one and four. The inner moon is about one hundred miles in diameter, you know, and somebody figured it would be a grand thing because nobody could make a device powerful enough to start disintegration waves in that, and so it would be safe to use it as a fort as before. And then I asked why not use it to attack, and they thought it was a good——"

"Well, I'll be a square circle! Sweet swinging satellites! Break it loose and use it for a battleship—and what a battleship! No armor, but too big to hurt——" Spencer stared in ecstasy. "Good lord—a whole moon for a battleship charging across space for five hundred million miles!"

"Oh, not quite a battleship—just a sort of mop." Munro grinned. "You see, the Tefflan orbital forts and Teff-el's moon, Teff-ran, are all so deadly they can't bring their battleships in close. But Teff-ran, of course, has no driving mechanism, and the orbital forts have just enough driving mechanism to keep their orbits stable and regular. Everything else is fighting apparatus."

"So they thought they'd use a Shal torpedo device to run a tunnel clear to the center, set up a huge driving apparatus of the momentum-drive type—and—just go down and circulate around Teff-el. They could simply ruin all

these orbital forts—reduce them to powder. They might jar that moon a bit, but what it would do to the forts would be final.

"Then the men aboard would set the drive full blast, escape in a scout ship, and let the whole thing ride straight at Teff-ran. Teff-ran is bigger—considerably—but with Ma-ran traveling about fifty miles a second and the mass of quintillions of tons—that will be all there is to that.

"Meanwhile, trailing behind, and falling all the way in a straight line toward Anrel's mighty sphere, will be the seven-hundred-mile-diameter Ma-kanee. It will be aimed straight at Teff-el——"

"And that will end Magya's worries for once and for all," finished Spencer. "If they can do it. Can they?"

"That alone wouldn't end their worries," replied the physicist, "because they might be able to escape by shiploads, you know, and start another colony. But, in the meantime, a ring of battleships and scout ships will surround the planet and put a stop to that. These Magyans mean business. They don't intend to have Teflans attacking humans any more. They did that once, you know—we did? Anyway, Earth doesn't have them any more. These fellows are thorough——"

He paused with a grim little gesture of finality. "They can do it with time. They intend to build a fleet of no less than fifty supply ships and keep up a constant stream of charged coils to the planet from Anrel. Also send a sun-beam all the way to Anrel. With a giant sun like that behind them, it's no question of power enough. The momentum-wave device means that the question of drive is settled. They have only the physical problem of manufacturing coils enough to store the power.

"They plan to accelerate the moons till they simply widen their orbits to freedom. That will prevent any sudden shifting of tidal effects on Magya.

They feel that no harm will result, but the astronomers and mathematicians are at work calculating.

"I feel confident that, with time, they can do it. They have an enormous advantage in that supply of steel they took from Tefflan. Teff-el must be hard put right now to mine an entirely new supply of metal, besides the problem of labor. And their work is going to be speeded to the utmost."

"Why worry? Just use that traveling moon to perambulate through a few battleships, too." Carlisle laughed.

SPENCER looked pained beyond words. "Go get a whale to slap mosquitoes with. Use an elephant to crush little brown fleas. Get a transon beam to shoot down butterflies. With the difference that the battleships would simply dodge, and come around behind, land on your perambulating world, and start digging their way inside. It's bad enough using it on those huge forts; they really intend to use it on the fortified moon there. And, I suspect, on Teff-el itself. Right?"

Aarn nodded. "They'll calculate a course of impact that will carry the broken masses straight down to Teff-el. That alone will cause damage enough.

"The danger of waiting is that they will build up a fleet of speedy ships, well equipped with death beams and disintegrators, realizing that the warfare is now reduced to two types—a light, swift, almost invisible scout-ship type, and the great behemoth battleships. They haven't the time or the metal for the battleships. But they may build the light fellows, and then they could escape.

"The next time they'll have ships that can fight our scouts and spies more effectively. Also, next time they are going to have a nice, empty, insulated cylinder in the exact center of their ships, so that our gravity bombs can explode in peace—and harmlessness. They

may not know how it's done, but they learned quick enough what was happening, you can bet.

"But I haven't yet told you what's been worrying me. The plans are good. But they mean the one-hundred-and-one-per-cent annihilation of Teff-el. They mean destruction more thorough, more complete and final, than anything you can imagine. That planet will be just a mass of drifting asteroids.

"And somewhere, on some one of the countless thousands of asteroids, buried in a terrible, inextricable mess of incalculable orbits, will float serenely a bit of planet with eleven thick plates of gleaming silvery metal engraved with age-old characters, eleven plates of osmiridio-platinum alloy that would endure for ages, carrying the data that would get us back where we came from——

"And no one in the universe or the universes could ever find them again."

SPENCER and Carlisle were stricken suddenly silent.

"What'll we do?" gasped Carlisle at length.

"Exactly!" Aarn nodded. "What'll we do? Santin Rao has ordered immediate work on the great project, and they calculate that not more than eighty days will be needed to complete it. Somehow, within those eighty days, we must recover those eleven plates of osmiridio-platinum. Otherwise we spend the rest of our natural existences here. Not that it's unpleasant—but it isn't home. I could get that data—with thirty years' work and calculation. These fellows have never attempted to get it. They weren't interested. Too much else on hand."

"Have you any idea where, on Teff-el, they are?" asked Spencer.

"None. But at my plea, Santin Rao is going to have every attempt possible made to find them. And I'm going to

make some little things—they may help."

"What?" asked Spencer eagerly.

"Eh—a little thing—I don't know if it will work, or if we can make it or ——" Aarn paused.

"Oh, shut up! Another one of your secrets. All right—take it away—and listen to this one: Carlisle, here, tells me he's got an idea from something you said about physics, and some studying he's been doing, that may help us a lot if we ever have to raid Teff-el."

"I hope so. We'll need more than help; we'll need a miracle to recover those tablets. With modern spatial warfare, a fight over the city or building where those plates are means the destruction of everything within a million miles of it. That means that somehow we have to get those plates secretly. That's the devil of it."

"Sweet chance of slipping by all those guards the Tefflans have. Spy ships. Orbital forts. Telescopes. Probably some form of detector device."

"Yes—the Magyans have the same thing. It's micro-wave radio, about ten-centimeter wave. Anything of any size reflects the waves and makes a difference in reception. They use them as a meteor detector on small ships. Big battleships, of course, are protected by those space-disk repulsion effects."

"Hm-m-m! Seems interesting to think that those four-foot steel walls will stop anything man ever sent, and meteors could wander through them practically unhindered."

"Not quite that bad, Spence," Aarn replied. "I'll bet you have been inculcated with that same doctrine that the space-ship designers always had. I never stopped to think about it till I was working on that magnetic atmosphere. Lead is a better protection against meteors than steel. A meteor's kinetic energy is so great it could plow through something like forty-five feet of steel, following the usual law of penetration

—varying as the square of the velocity.

"But here's the trick: a meteor plows into the steel, and has to overcome not only the tensile strength of the metal, but the far greater inertia resistance. Even to ordinary bullets that means something. Remember that water will deflect a bullet like a solid body. Water will flow freely, and so would steel under the impact of a meteor, but it has inertia, and so acts like a solid body, and, as you know, a meteor hole is seldom found to be anywhere near the size of the body that made it.

"What happens is that a one-inch meteor strikes, and the steel resists it with its inertia; each steel crystal acts as a resisting medium and must be accelerated out of the path of the meteor. But the impact generates such heat that the steel molecules are smashed into the vapor state and evaporate. The explosion of expanding vapor is what tears a hole.

"I've seen a one-inch meteor leave a three-foot hole through six-inch armor. And then never get inside the ship! It was blown into vapor along with the wall of the ship. So probably that four-foot armor would stop the average meteor and be torn wide open in the process. I'm working on something of the sort—too—"

"Another secret I suppose?" Spencer put in bitterly.

"Probably," Carlisle agreed blithely. "Come into my lab; I'll show you something interesting. I'm getting on the way now."

IT WAS some five days later that, seated comfortably in the quarters that had been assigned to Spencer, rooms carved from living rock and carefully and artistically decorated with friezes, Carlisle and Spencer were disturbed, nay, even startled, to see a black object the size and general shape of a football come floating gently into the room, turn a cold and unwinking glass eye on them,

and say in a slightly cracked voice:

"If you two asteroids with planetary ambitions will arise and follow me down the corridor, I can show you where men of brains are laboring."

Then it fell silent. It stared at them for some seconds as they sat in stupefied amazement, then turned leisurely about and started out of the door. Its cracked voice commented only that:

"Two such frog-mouthed, ant-brained, instinct-controlled undernourished runts weren't worth the trouble, anyway."

"Well, I'll be a hyperbolic-orbited asteroid! That grease glob from Jupiter has a new idea."

With which Spencer tore out of the door and down the corridor after the fast-vanishing black ostrich egg. Carlisle was on his heels as the soft black of the device all but hid it in the slight gloom of the corridor leading to Aarn's quarters.

Aarn was seated grinning before a television board of a new and complex type.

"Rather clever thing isn't it?" asked Aarn and the egg at the same time.

"Which of you should I answer?" asked Spencer sarcastically. "That egg up there looks more intelligent. I thought it was a bomb getting ready to blow up when the blamed thing floated in there."

"Yes—we are thinking of that idea, and Anto Rayl, here, has already turned the plans of this device over to his government, and they are making a number of them. Present idea is that after a Shal torpedo has breeched the walls of the ship, these can sail in and start operating on the internal structure as directed.

"This particular model is the new-type spy ship. It consists of miniature—very miniature—space-ship drive of the momentum-wave type, two small but powerful aggie power coils, a radio-control apparatus, and a small radio-send-

ing apparatus connected with a television device of the usual sort—but smaller size. Rather crude. Not a good lining on the screen, but you can see enough, and the ears are quite effective. The whole report is sent back continuously on two short-wave beams.

"As I said, Anto Rayl has turned the plans over to the government, and they are making about ten an hour now. They plan to increase the production to about fifty an hour and equip all ships with them. The *Sunbeam* is assigned to special duty—with seven full-fledged momentum-drive antigravity-powered battleships and twenty of the new cruisers. Our duty is to patrol and investigate, by any means possible, the doings of Teff-el. The battleships and cruisers are to protect us."

"And you will start hunting for the Data Plates?"

"Absolutely!" replied Munro joyfully. "And find 'em if the Tefflans know where they are—because a number of the professors of languages on Magya, here, have taken the trouble to learn Tefflani—records on their ships and so forth, both written and oral.

"But—you don't yet know the beauties of this television device. This is my real invention, and I'm proud of it. They've said it couldn't be done. You notice the absolute lack of color on the screen—just the greenish white and black of the cathode fluoresce. I can't get any color on this thing ordinarily. There are really two television devices. One for normal operation, and one—"

The television screen went suddenly blank as Aarn pressed a button. A second passed, a faint click from the loudspeaker over the control board, then the screen was lighted again—on a weird scene. It was still the same room they were in, still the screen showed them sitting and standing as before—but now they shone, and the walls of the room glowed in light reflected, light emanating from the men.

"Infra-infra-infra red." Aarn sighed. "Long heat. And what a triumph that is! That's one of the biggest things I ever did. That was a real problem, and I want you to know it. With that, television can operate in absolute darkness!"

"That man passes my understanding," said Carlisle in awe. "His mentality is beyond the comprehension of sane minds. His psychology is not to be analyzed. He builds a space ship that defies gravity; he powers it with energy stolen from the Sun; he defends it with space, warped beyond passing; drives it by meshing in the fabric of space—and goes into raptures over his cleverness in making a fool television eye. It passeth understanding!"

"No; it doesn't, Carlisle. It's all reasonable enough. Physics had known for years that antigravity fields were possible. They knew that power beams were a possibility, that momentum waves were theoretically possible."

"But they said that a heat-eye was theoretically impossible. I can't see how it was done myself."

"Principle of the ordinary television tube. Deposit of metal in globules, discharged by a cathode beam, and effecting a condenser action. Only in this case, my globules are bimetal globules, and one of them acts as might be expected under radiant heat and throws off electrons. Same idea. An ordinary thermo-pile in effect, but that each element is about one ten millionth of an inch in diameter and weighs about one ten billionth of an ounce. The result is rapid reaction. And I have a lens of a special type which will bend those long heat rays. It's really a permanent space structure like that invisibility device. It bends any incident radiation—any radiation—and so can be used equally well on ultra-violet and sub-red."

"It's a strong weapon for finding

our data. But—what are you going to do when you find them?" asked Carlisle. "That's not going to help there."

"Grrrrrr—must you bring up unpleasant subjects when I'm happy?" demanded Munro. "We're going to make a direct raid in secret, then—and do our damndest to get those plates. That's all we can do."

XIII.

THE *Santir Ranla* and the *Toal Deenar* had combined in their efforts to crush with the least possible delay, and the least necessary expenditure of energy, the presumptuous heavy cruiser the Tefflan had sent out to investigate the doings of the Magyan fleet that was hanging grimly outside their maximum effective beam-range.

Since the *Santir Ranla* and the *Toal Deenar* were both first-class, new, fully armed battleships, with special alloy-steel armor which had been altered by the addition of a few new elements till the Tefflan standard beam didn't disintegrate it, they crushed the cruiser within forty-five seconds and cut it up for transportation back to the hard-working steel plants on Magya. Every little bit helped.

Aarn went back to work. Anto Rayl and several other Magyans were in the control room of the *Sunbeam* with him as he sent out his little "egg-boat," as the investigators had been called, and attempted to land it on Tef-el safely. He met with difficulties as usual and cursed the Tefflan ship heartily.

Tef-el was nearly a million miles away, which meant his control of the little machine was extremely poor, since the light-speed messages that controlled it took several precious seconds for the round trip. He had to move it slowly, exploring carefully before him. Already the little ship was nearer Tef-el than any Magyan had ever been.

The egg-boats, as made in quantity,

were egg-shaped, and about eight inches in greatest dimension. They contained no apparatus for the projection of speech, as no attempts would be made to attract attention—decidedly the opposite. Since they were black, Aarn had carefully chosen to send them in from the day side of Tef-el; they were therefore black against black space.

The present egg-boat was within about fifty miles of the surface of the planet when Aarn had been forced, by the lightning swoop of the Tefflan heavy cruiser, to move rapidly to other regions and had moved out of the little investigator's beam. He'd picked it up again, to find the thing was headed for a body of water, and though he'd sent a reversing message, he feared he was too late.

"Blast that restriction on the speed of light! I can't get anywhere this way," he grumbled. "I'll have to send another one now, and every time one of those things is spotted by a Tefflan, it will mean another three hours' work."

"Why not lower a whole collection at once?" suggested Anto Rayl.

"Why—that might be possible—they'd have to respond to two wave lengths—a master wave, that they all obeyed, and a key wave, that they reacted to individually, but it might be done. Canning!" he called suddenly. "Hey—Canning, see if——"

He turned back to the screen as he explained and watched the body of water coming steadily closer. Suddenly it stopped.

"Ah—in time to save Investigator No. 1. Now to see what can be seen. We'll have to explore the planet a bit. You say that Cantak is their largest city, and near here, so I'm going to find a cave or something that I can use to hide that bunch in when we land them."

Rapidly the sea sped behind the lens of the little investigator, and as it finally picked out a dim, distant foreland, Aarn



The machine was white-hot now. "It will explode!" one of them gasped.

sent a stop signal, followed by a slow.

In minutes a rocky, savage coast was in view, a mass of piled rocks, an ideal location for such a cave as Aarn wanted.

"Are the tides on that world high? I shouldn't think so."

"Very low," replied Anto Rayl. "The single moon is small and distant."

"I don't think water would damage

those things any, but I don't intend to try."

The scene on the screen moved slowly along, very little faster than a walk, lest the investigator pass a good spot, or run into a sudden jutting point before Aarn could stop it.

"Canning!" he called suddenly, pushing the stop button of his control. "I'm going to take a chance on their finding

that darned thing and stick in an anti-gravity device, so that it can't run into things and smash itself. I can't creep all over the whole blasted planet like a snail with rheumatism. Fix up those others and bring them out as fast as you can."

"Yes, sir. I've got that radio device fixed up now. It wasn't much trouble—just another coil. I can't quite tell you which one will react to which key wave length, because they are so much alike, but you can pick 'em out. I'll stick in an antigravity coil—if I can find any room."

Aarn turned back to his control, to see the mouth of a great black cavern looming exactly before the eye of his investigator. A great split ran up the cliff, and high above, out of sight, closed in, but it made a narrow cleft cave.

"Ah—luck at last!" He sighed.

He pressed a series of controls and waited.

PRESENTLY the screen went blank, shifted, and lighted again with the strange distortion of the heat-eye. The black of the cavern was suddenly light as the investigator entered slowly and followed it back at a pace of about three feet a second.

Aarn punched a control viciously as a sudden right-angle turn loomed up ahead. Calmly the investigator drifted on, and on. Then, with a tinkling crash from the loud-speaker mounted with the screen, the view went dead. The hum of the mechanism went on uninterruptedly, as well as the roar of the surf outside the cave; but the screen remained blank, and a slight straining note sounded in the apparatus. The drive was trying to move the cliff.

Aarn pushed a second control with a prayer and waited. A slight change in the tempo of the sound in the loud-speaker came after a few moments, then a click, a soft hum—and things went on as before.

"Lost! Television-control tube gave way, evidently. They weren't made too well, I'm afraid, too much of a hurry, and with any severe jar, they give way. The rest of the thing's all right. And as useful as a left-hand thread bolt when a right-hand is needed."

"I've got six of those things rigged up, Dr. Munro," announced Canning. "Those small antigravity coils for storing power can be modified a bit, and I used one of the power-storage coils as an antigravitor. You have more than enough power left, haven't you?"

"Certainly, Canning! That's good. Send 'em out. What's the master wave?"

"Eleven point five-five. I'll give you the key-wave list—"

This time, the cave in the cliff was reached easily and safely, a dry floor found well back, and the investigator left. One was brought out on the key wave and immediately started toward Cantak, back in the mountains. It struck a road presently, a broken, rutted track of concrete, with an occasional pedestrian of the Tefflan race. Instinctively, to his surprise, Spencer felt the short hairs on the back of his neck rise, and a wave of anger swept over him at the sight.

"The monsters!" he said in a low tense voice.

Anto Rayl chuckled. "You are a human," he said; "you cannot help that feeling. I know them, have seen them—and hate them more with every sight. Yet I know that they are reasonable, intelligent creatures; that they are no more cruel or evil than we; but our hatred for them is as instinctive and as complete as the hatred of aneth and carlee."

"Cat and dog," said Aarn. "We're born that way; so are they."

The investigator shot rapidly ahead now, in clear daylight, high in the sky. There were ships up here—ships that scurried busily across the sky between

cities. There was a great deal of anxious activity, and the furnaces that stood aboveground, alone of Tefflan city structures, were evidently working hard. A great opening in the ground, into which ships of all sizes were constantly sinking while others rose from it, betrayed the entrance to Cantak.

The investigator crept forward at a speed of some two feet per second, till it was directly over the great bore. Then Aarn let it drift across.

By far the most common vessels were huge. The next was. The little investigator was caught by it, lodged in a crack under its great, stubby wing, and carried down, cushioned by its anti-gravity field. Aarn gave a stop signal and knew the little machine would remain in place unless heavily jarred in landing.

The ship it clung to, descended, landed in the midst of a great terminal, a bustle of Tefflan activity. With a sudden swoop, the investigator detached itself, shot straight up into the air, and disappeared in the black roof of the great cavern before the startled Tefflans could guess what had happened.

Laborers, common Tefflans, they paid no further attention and went on with their work. And all that day, behind doors, hidden in great vessels, in small vases and among bushes in parks, the investigator listened and watched and sought. It crept out when the lights were turned down for the rest period and slunk into important public buildings, buildings that had no window glass in this great cavern where there was no weather, save that which they made themselves. Through ventilation tubes, through doors, through transoms, the investigator went, seeking records, secrets—

Never before had Magyans had so perfect an opportunity to learn every secret of Teff-el. But they could not read the records they so much wanted. They listened to a chance conversation

between officers of the merchant stratosphere ships, and space-ship warrior officers. And learned only that no Tefflan save those few who manufactured the essential parts knew of the secret of the ray, and the reason it was made so great a secret was that no known apparatus would stop the effect of the ray.

IT WAS NIGHT now, and the public buildings were all but entirely closed; a lone watchman wandering about here and there was the only sign of life as the investigator went silently through the various corridors, occasionally bumping noiselessly against a dead end until turned by a new radio signal—a curious thing that seemed blind to its surroundings, blundering here and there, and learning this and that.

"I think that new plan to attack the Magyans will be wholly successful—a thing they cannot resist. Ah, if we but had brought Magya that strange new destructive ray! Without it, we would have—need—" The voice trailed off into a maze of roaring traffic sounds.

"The new ships, you understand, will have a hollow center, and the center-explosion bombs of the Magyans will be useless. The magnetic bombs we will deflect easily now, with the new apparatus of Hoo Ralsop, and tune them instead—"

"Some have suggested that those strangers who came in the ship attacked by the scouting squadron, when first the destructive, fusing beam was used, were some of the surviving, ancient Mahay-anhy of legend, who came through. Perhaps they were messengers—but they had such war craft that surely the Teff-Hellani—our own race on its native world—must have grown equally great in power.

"Hoo Ralsop is working now, they say, to devise a means of at least signaling through—"

"I'd like," commented Aarn in an

noyance, "to know who in the name of the nine wabbling worlds that Hoo Ralsop is and, more important, where he is. He seems to be a prominent scientist, and if he's working on communication between spaces, his aims and mine are parallel, and I'll bet a major planet to an asteroid he's got at least an accurate copy of those Data Plates.

"Could he read 'em, Anto Rayl?"

"Probably, in time. We could read them with a little study, and with the aid of your knowledge of the other side. Hoo Ralsop would be laboring under the difficulties of not having our knowledge of ancient Magyan language, and complete ignorance of the other side. He will, of course, have the assistance of a knowledge of modern Magyan, but the language has altered beyond understanding, almost, and it was only after great study, and careful consideration of the ways in which languages do change, and the following back of our more modern tongues, that we were able to read the ancient records. Hoo Ralsop would have a heavy, but possible, task."

"Might they not have translated it already?"

"Why should they? They had no great interest in it before they found us in modern times; it was merely loot of ancient days which they had been told was sacred and to be kept. After they found us—I think I am not too boasting in saying we occupied their attention rather fully. Their linguists were busy trying to keep pace with the various codes we adopted in giving our sealed orders to ship commanders. We have some ancient Tefflan records—in Teff-hellani really—that we have never had translated, beyond finding what they mean. But is it important?"

"Decidedly! I don't want a few battleships of the kind Tefflans are used to going over and attacking our commerce in the other world. Good Heaven, they

could wipe out half the population there—we have no real defensive machines. Of course we could build them in a few years, but Tefflan battleships attacking wouldn't give us a few years.

"If Hoo Ralsop can act on that data very quickly, we're going to find out who and where Hoo Ralsop is—and—we might do that, anyway, just for safety. I have a dozen or so of those things made up with equipment to explode them at will, or when tampered with. I think we'd better find out where he is."

"Have you heard the latest news from the government laboratories?" asked a growling Tefflan voice, while a trained translator spoke softly into a microphone the corresponding Magyan words. "Hoo Ralsop has found among some ancient religious relics a number of plates in what he is sure are ancient Majhay-anhy characters that deal with the crossing from one space to another. The relic plates——"

AND ON Tefflan, the drifting, seeking investigator had drifted slowly past the office whence had come those voices. Aarn was grimly, silently busy sending it back. Seconds passed. Long, long seconds while nothing happened, and only the strangely lighted scene as shown by radiant heat swept over the screen, and the dull sound of traffic outside, activated the instruments. The thing stopped, swung, and started back. Instantly Aarn pushed the stop signal. It would take equally long for that signal to get there——

"—naturally wouldn't let him take them out. They were sacred relics, and protected apparently by an ancient legend that some day they would lead our race to greatness and a land of plenty once more. This prophecy had protected them through hundreds of thousands of moons, and they had been made of a metal which would endure, so they were quite legible.

"Hoo Ralsop has called in Sol Kaldan to aid him in his research, and surely with such a student of physics and such a student of languages, we shall learn something of import, for the plates evidently have been considered of importance from oldest times. Hoo Ralsop's copies are exact as can be, even to microscopic dents and scratches."

"But what does he hope to learn, what does he think might come of such a search in legends ages old? Truly, once we could learn from the ancients, but now our weapons pass theirs manyfold," replied the second voice.

Aarn dared not try to look at the speakers behind the half-opened door.

"That, he believes, is the secret of the ones who came in the strange ship, bringing the strange weapon. Remember, the controller of the destroyer which escaped their blasting ray said he saw them materialize suddenly as though sweeping in from infinite distance with infinite velocity—yet there was something lacking in that conception, since they seemed rather to expand from infinite smallness and not move at all. He was certain, though, that they came in no normal way."

"The physicist of Santakalt says they came from this other space."

"Then why—but stay—look you—that magnetometer is fluctuating with my speech, and with other signals, too. What can that mean? Ehu—it shows a center of force near here! I don't like it. Let us see—ha—it is near, too—"

Frantically, and yet resignedly, Aarn had pressed the signal that would send the little investigator away at its best speed, within such narrow confines. He sent a complete series of signals which would have freed it from the building, by driving out of an open window, but the Tefflan suddenly appeared in the door.

"Hayuu—look! What manner of thing is that?" He reached for it, and the little investigator sheered away.

"Ha—it has some manner of control. Now what can be the meaning of this?"

He darted back into his room and reappeared a moment later with a device the size and shape of two pie plates stuck together, and trailing a long cord:

"Let us see—"

The investigator suddenly darted for the pieplate device, in fact a powerful electromagnet, and stuck. Aarn sighed and pressed a red button on one side.

Some fifteen seconds later the Tefflans were wrestling with the struggling, pulling little investigator, as it sought to obey the commands. Then, suddenly, the screen went dark in a sudden flash of light. The little investigator on Tef-el turned bright red and sputtered sharply with blue electric flame.

"That is the end of that!" said Aarn, but he wasn't much disappointed, for he had learned at least that the records still existed. "Now—problem one is to find this Hoo Ralsop. They mentioned 'the physicist of Santakalt,' and I just wondered if that might be he."

"It is." Anto Rayl nodded. "I remember that some of the reports we have found on destroyed ships have stated that that city was their scientific base, and a division of Santakaruck, their main space-ship base."

"Next—where is Santakaruck?"

"That, too, is known, of course, and we can send the next investigator there—but how will you find Hoo Ralsop?"

Aarn smiled suddenly, a smile that wandered clear across his face. "That," he said, "will be easy if he's as important as all that. Watch!"

He started an investigator out of the base in the cave, flew it swiftly toward Santakaruck and, when it was on its way, switched to the key wave of a second investigator and started it close in the wake of the first. Aarn was very busy for the next few minutes, in fact till he had both motionless just outside of Santakaruck.

Then he started a curious process.

The investigators had been equipped with small gas-glow lights in case they had to see something where no light and insufficient heat was available. And now Aarn waited till a scout ship started in the great tunnel that led down into Santakaruck, then turned on the light on one of the investigators, and started the ship cruising in circles slowly down into the great opening of Santakaruck.

While the first was slowly and aimlessly proceeding automatically on this order, he shifted to the second device. In seconds he was watching the scout ship stop and then begin a series of movements to investigate the strange, tiny ship.

They had it presently and bound it down tightly.

In triumph they bore their prize into the city, and attached closely to a part of their landing gear where it was nearly invisible was the second investigator.

LIKE a leech it clung to the trail as the first machine was taken to the space-ship port, investigated by higher, and yet higher, officers with curiosity—while at another receiving board Magyans listened carefully to all that was said there—and at last scientists were called in.

"I think it is a bomb—a sort of self-controlled torpedo," announced a physicist at length.

"Nonsense! The Magyans' brains are not so poor. They built this, surely, and it must be investigated carefully, but no bomb of this size is dangerous. I am interested to know the method of control. They are not being rained on the planet, why, then, did it happen to be here? Were there more?"

"None were seen, most excellent sir."

"Meaning, fool, that you didn't look."

"I stand in the guilt of negligence, most excellent sir," acknowledged the scout-ship commander.

"Ehuu—use your head—and your

eyes, too, next time. Now—go out and look about."

The scout-ship man left hurriedly.

"I think it is a bomb," persisted the physicist, "and not necessarily a chemical one. Might it not be the storehouse of much physical energy—an accumulator? Or a new and unknown kind of power-storage device, a bomb that will go off at any time?"

"More likely," suggested a chemist, "might it not be one of the bombs like those we are preparing—biologic bombs, full of germs; it could do untold damage."

"Ehuu—what unpleasant ideas you have!" exclaimed the most excellent sir, hurriedly releasing the little thing, and backing off, wiping his long-fingered hands. "Can you test it?"

"I think it would be better," suggested the chemist, "to call our masters. This is indeed important. I believe that Hoo Ralsop would be interested, for this may be an idea of those from the other side."

"That's interesting," said Spencer, "what they had to say about biologic bombs. Could they make them?"

"Oh, decidedly! They must have done it already."

"That is all well, Aarn," said Anto Rayl contentedly. "We are preparing already. How great will be their joy when they learn that their discussion has reached us in its entirety!"

"Sorry, Anto Rayl, but they won't. If I let Hoo Ralsop get so much as a glimpse of the interior, he'll know a number of things it isn't good for little Tefflans to know—such as how to make an antigravity power coil," Aarn pointed out.

"Hoo Ralsop says he will come, but is much annoyed, since we disturbed him in a perusal of the ancient plates," said an assistant as he returned from a telephonic device.

He stooped momentarily to pull some-

thing from between the halves of his left hoof and suddenly started.

"By holy Renoo! That is no blank hole in the end—there is some potent force at work which twists light—distorts it. By all my physics, I swear it! That is a lens!"

"What? A lens? It is merely a magnetic-force wall of some kind!" scoffed a second Tefflan. "Light does not bend so readily as that—it requires some substance."

"Silence—listen to me!" snapped the discoverer of the force-lens. "I say that it is a lens. We shall see what Hoo Ralsop says, and, till then, say no more. If that is a lens—then this is a bomb. It is a bomb which will blow us up with our own words—it is a spy machine—a device to slip about and learn, from our own lips and laboratories, our secrets. Probably something went wrong with the mechanism that made it go off its course and so be discovered. If that be so, then surely it has ears as well as eyes. It may be sending back a beam of radio information at this instant. Put something over that eye."

In an instant a container of some sort shut out the light from the investigator. But though a silence fell, a few moments later the second investigator, outside the room, showed a group of three Tefflans trotting toward the office. Their hoofs made almost no noise on the soft rubberlike flooring; but evidently the men inside the room knew they were approaching, for they opened the door. The light streamed out into the less brilliantly lighted corridor and would have illuminated the second investigator had it not been clinging to the ceiling, above eye level, and above the light.

Hoo Ralsop was aware of his importance. And he was, justly, perhaps, annoyed. "For what cause, Aggar Mankel, have you summoned me from my investigation of the Kakkakill relic plates." And he said part of a further sentence, which, due to the peculiarity

of Tefflan word-order, would translate something like this:

"Other-space secrets from Kakkakill relic plates beginning to learn of greatest—"

"Stop! Do not speak—this device is some machine whereby the unnatural ones, the Magyans, can listen and watch us."

The cloud of anger that had swept crimson over Hoo Ralsop's normally red face disappeared as suddenly as it had come. "Ehuu—what is this? Let me see this!"

SOME two seconds ago Aarn had pressed the red button that converted the little investigator into a red-hot mass of metal that would glow for several hours. Hoo Ralsop was looking into the force-lens with great interest when it collapsed with a report of inrushing gases, and the metal in his hands flowed red-hot abruptly. With a curse of pain he dropped it to the floor.

"By the nine greatest gods, the thing has burned me! May the soul of its designer rot forever in the lowest level of the filthiest hell! The damnable thing—may it be accursed forever—has taken half the flesh from my hands!" Hoo Ralsop glared at it with slit eyes blazing in anger, his raw hands agonizing.

"Most gracious and learned sir, let me dress the wounds," begged a humble doctor, who was present, gathering a small kit from the lockers just outside the doorway.

"Dress them, you clumsy fool, and if you do a poor job, I shall have you condemned to the prison of Carcaton for incompetency. As it is, my work will be held up—"

Aarn had not been idle during this time. He had been busy, indeed, with a second control board. And he was prepared now to interrupt Hoo Ralsop's speech.

An investigator two feet long and a foot in diameter entered through the

doorway, and stopped in the center of the room. Hoo Ralsop's speech broke off in amazement, he stood paralyzed for seconds, and the ship finished it for him:

"Forever!" it said in a cracked, metallic voice—and perfect Tefflani. There was a dull click, the machine grew slowly red, brighter red—

"It will explode!" gasped the scientist and dived for the door. The machine was white-hot now—and the scene vanished in a roar of flame.

"That," said Aarn contentedly, "destroyed the cavern for half a mile around, I suspect, for the coils in that little thing had plenty of power."

The screen lighted up again presently—again in the cave by the seaside. It was light there now, distant Anrel shining in, bright blue.

"Kakkakill seems to be our next destination," said Spencer. "Where is it, Anto Rayl?"

"I might have guessed where we'd find those plates. I should have thought more seriously of finding it by thought. The city of Kakkakill is their holy city. Kak-ka is their principal god. He is their god of victory.

"And he is their one genuine bad point, to which we can point with reasonable loathing. There is a ceremonial of consecration to him each thirteen moons—each time their moon makes thirteen circuits. It is called the 'Death of Time' or 'Death of Time Unit' festival. And in that consecration they must drink to Kak-ka in the blood of a captured foe, and eat of the flesh of a captured foe, or they eat of the flesh and drink of the blood of one of their own race—a young female usually is sacrificed if need be.

"But if they capture a foe, and lose the engagement in which the foe is captured, then they cannot sacrifice that foe to Kak-ka, for he is the god of victory.

"They lost their last battle with us.

One of their own females will be sacrificed this time—the sacrifice is due in one and a half moons."

Aarn was interested—decidedly. "That is not so good. It is interesting—thirteen moons is the length of the year in the other space. The year is the time unit there, and this sacrificial festival must have been brought over with them, the 'Death of the Year' was what it was called back there, I suspect. The consecration was probably intended to bring them victory during the next year—a logical time division on Earth, since the year has important climatic manifestations there.

"But if those plates are there—we'll have to raid—and they'd be extraordinarily glad to see us—"

"I'm afraid," said Anto Rayl soberly, "the plates are there. They have the sacred temple to Kak-ka, remember, and all the relics. When that ancient Teffhellani looted our ancestors of that series of plates, he no doubt turned them over to Kak-ka for protection, to the god who had given him his victory.

"The Temple of Kak-ka is also their greatest museum, for it contains relics that have been given to Kak-ka through all the ages since he was first worshiped on that planet. Now it is, of course, a semiscientific museum.

"We have no choice, so far as I can see. I'll investigate, of course—I'll have to learn the way, anyhow."

IN MINUTES the investigator had been brought near the entrance of Kakkakill, but bringing it in was a problem, for there were few ships entering and leaving here, and it was daylight now. Most of these ships were small, private machines carrying supplicants to the temple, for Kak-ka was also god of business victory.

Aarn at last hid the investigator and turned in for rest. It was dark in Kakkakill when he had risen and breakfasted. When once more the investiga-

tor set out, it penetrated through the tunnels easily now.

When the investigator, entering from a great, tall, cathedra-like tunnel, with great stone arches, carved and lighted with glowing blue and green, strangely beautiful effects produced by fluorescent paint and ultra-violet light, came into that main cathedral of Kak-ka, Aarn had to admit himself impressed.

It was a single gigantic cavern, the floor square, four enormous arches soaring up to meet in the center of the roof, nearly one thousand feet above. A dim, dusky glow of violet light seemed to pervade this higher region from thousands of tiny, hidden lights. The walls of the cavern were carved in bas-relief, and the carvings then colored with the skill of a great painter. Each scene represented some great victory in the history of Teff-el, or some great prehistoric victory of legend.

And in each Kak-ka appeared in the background.

But in the cavern, Kak-ka was in the foreground. It was a statue. A thing breath-taking, awe-inspiring, horrible—and magnificently beautiful. Kak-ka towered a full three hundred feet. He was a Tefflan, of course, but the Tefflan of a Tefflan's ideals. The gigantic face was stern, and powerful—yet inspiring, even to a human. It was turned up, looking onward. One hand was raised on high, a great sword in it, the other beckoned.

And the whole, gigantic thing was a blazing, faceted ruby. Synthetic, necessarily, but the magnificent, high color,

the glow and the fire of the gem was there, and, under the wonderfully skillful lighting, magnificent. Kak-ka's trappings were simple, and all of red-gold and blue-white chromium alloy; his mighty sword glistened like a fiery beacon, and from its tip sprang a beam of golden light that cut a swath through the violet dusk of the upper reaches of that titanic cathedral, a beam of gold, laid on a background of purple velvet.

Between the feet of the colossus was the altar, a single gigantic block of sapphire. Some hidden lights within it made it glow continuously with that imitable, indescribable blue of the most perfect jewel. And on each side of it burned a steady, unwavering flame of pure white light, frozen radiance, a perfect spindle that stood three feet high.

BEYOND and behind the image of Kak-ka was the temple. It had been carved of some white stone, a marble, perhaps, which stood out like a white crystal box in this cavern in dark rock.

"I never dreamed," said Anto Rayl softly, "that those Tefflans were capable of such magnificent things. We have our Temple City—but it cannot compare with that. Almost I can forgive them their monstrous forms while I look at that scene."

"I—I'll have to look in the museum," said Aarn at length. "And—that will have to be destroyed with the rest of Teff-el. I think, if it alone was saved, posterity would blame you for destroying the race that could create it."

To be continued.

Aarn plans a daring move against the Tefflans—and they retaliate with sheer living horror. The next installment is vitally important!

The Skylark of Valeron

Conclusion

by Edward E. Smith, Ph.D.

Illustrated by Elliot Dold

XXII.

IN THE throne room of Kondal, with its gorgeously resplendent jeweled ceiling and jeweled metallic-tapestry walls, there were seated in earnest consultation the three most powerful men of the planet Osnome—Roban and Karfedix (1), Dunark the Kofedix (2), and Tarnan the Karbix (3). Their "clothing" was the ordinary Osnomian regalia of straps, chains, and metallic bands, all thickly bestudded with blazing gems and for the most part supporting the full assortment of devastatingly powerful hand weapons without which any man of that race would have felt stark naked. Their fierce green faces were keenly hawklike; the hard, clean lines of their bare green bodies bespoke the rigid physical training that every Osnomian undergoes from birth until death.

"Father, Tarnan may be right," Dunark was saying soberly. "We are too savage, too inherently bloodthirsty, too deeply interested in killing, not as a means to some really worth-while end, but as an end in itself. Seaton the overlord thinks so, the Norlaminians think so, and I am beginning to think so myself. All really enlightened races look upon us as little better than barbarians, and in part I agree with them.

I believe, however, that if we were really to devote ourselves to study and to productive effort we could soon equal or surpass any race in the System, except of course the Norlaminians."

"There may be something in what you say," the emperor admitted dubiously, "but it is against all our racial teachings. What, then, of an outlet for the energies of all manhood?"

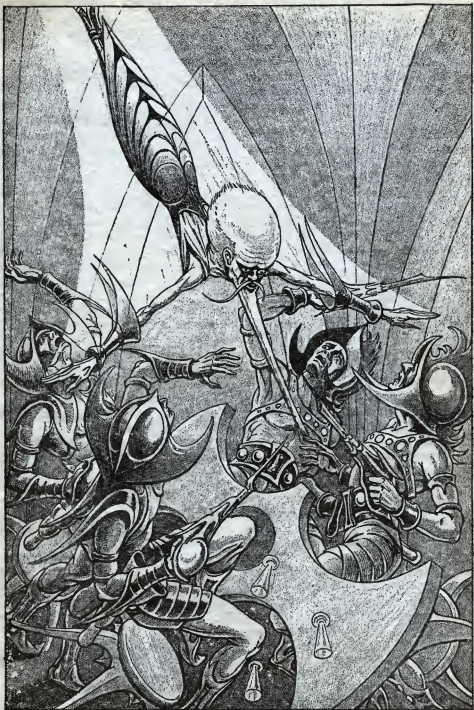
"Constructive effort instead of destructive," argued the Karbix. "Let them build—study—learn—advance. It is all too true that we are far behind other races of the System in all really important things."

"But what of Urvan and his people?" Roban brought up his last and strongest argument. "They are as savage as we are, if not more so. As you say, the necessity for continuous warfare ceased with the destruction of Mardonale, but are we to leave our whole planet defenseless against an interplanetary attack from Urvania?"

"They dare not attack us," declared Tarnan, "any more than we dare attack them. Seaton the overlord decreed that the people of us two first to attack the other dies root and branch, and we all know that the word of the overlord is no idle, passing breath."

"But he has not been seen for long. He may be far away and the Urvanians may decide at any time to launch their

Footnotes: (1) Emperor. (2) Crown Prince. (3) President of the Church and Commander in Chief of all armed forces of Osnome.



The four enraged men, all drawing weapons, were suddenly swept apart.

fleets against us. However, before we decide this momentous question I suggest that you two pay a visit of state to the court of Urvan. Talk to Urvan and his Karbix as you have talked to me, of coöperation and of mutual advancement. If they will coöperate, we will."

During the long voyage to Urvania, the third planet of the fourteenth sun, however, their new ardor cooled perceptibly—particularly that of the younger man—and in Urvan's palace it became clear that the love of peaceful culture inculcated upon those fierce minds by contact with more humane peoples could not supplant immediately the spirit of strife bred into bone and fiber during thousands of generations of incessant warfare.

For when the two Osnomians sat down with the two Urvanians the very air seemed charged with animosity. Like strange dogs meeting with bared fangs and bristling manes, Osnomian and Urvanian alike fairly radiated hostility. Therefore Tarnan's suggestions as to coöperation and understanding were decidedly unconvincing, and were received with open scorn.

"Your race may well wish to co-operate with ours," sneered the Emperor of Urvania, "since, but for the threats of that self-styled overlord, you would have ceased to exist long since. And how do we know where that one is, what he is doing, whether he is paying any attention to us? Probably you have learned that he has left this System entirely and have already planned an attack upon us. In self-defense we shall probably have to wipe out your race to keep you from destroying ours. At any rate your plea is very evidently some underhanded trick of your weak and cowardly race——"

"Weak! Cowardly! *Us?* You conceited, bloated toad!" stormed Dunark, who had kept himself in check thus far only by sheer power of will. He sprang

to his feet, his stool flying backward. "Here and now I demand a meeting of honor, if you know the meaning of the word honor."

THE FOUR enraged men, all drawing weapons, were suddenly swept apart, then clutched and held immovably as a figure of force materialized among them—the form of an aged, white-bearded Norlaminian.

"Peace, children, and silence!" the image commanded sternly. "Rest assured that there shall be no more warfare in this System and that the decrees of the overlord shall be enforced to the letter. Calm yourselves and listen. I know well, mind you, that none of you really meant what has just been said. You of Osnome were so impressed by the benefits of mutual helpfulness that you made this journey to further its cause; you of Urvania are at heart also strongly in favor of it, but neither of you has strength enough or courage enough to admit it.

"For know, vain and self-willed children, that it is weakness, not strength, which you have been displaying. It may well be, however, that your physical bravery and your love of strife can now be employed for the general good of all humanity. Would you join hands, to fight side by side in such a cause?"

"We would," chorused the four, as one.

Each was heartily ashamed of what had just happened, and was glad indeed of the opportunity to drop it without losing face.

"Very well! We of Norlamin fear greatly that we have inadvertently given to one of the greatest foes of universal civilization weapons equal in power to the overlord's own, and that he is even now working to undo all that had been done. Will you of Osnome and you of Urvania help in conducting an expedition against that foe?"

"We will!" they exclaimed.

Dunark added: "Who is that enemy, and where is he to be found?"

"He is Dr. Marc C. DuQuesne, of Earth."

"DuQuesne!" barked Dunark. "Why, I thought the Fenachrone killed him! But we shall attend to it at once—when I kill any one he *stays* killed!"

"Just a moment, son," the image cautioned. "He has surrounded Earth with defenses against which your every arm would be entirely impotent. Come you to Norlamin, bringing each of you one hundred of his best men. We shall have prepared for you certain equipment which, although it may not enable you to emerge victorious from the engagement, will at least insure your safe return. It might be well also to stop at Dasor, which is not now far from your course of flight, and bring along Sacner Carfon, who will be of great assistance, being a man both of action and of learning."

"But *DuQuesne!*" raved Dunark, who realized immediately what must have happened. "Why didn't you ray him on sight? Didn't you know what a liar and a thief he is, by instinct and training?"

"We had no suspicion then who he was, thinking, as did you, that DuQuesne had passed. He came under another name, as Seaton's friend. He came as one possessing knowledge, with fair and plausible words. But of that we shall inform you later. Come at once—we shall place upon your controls forces which shall pilot you accurately and with speed."

Upon the aqueous world of Dasor they found its amphibious humanity reveling in an activity which, although dreamed of for centuries, had been impossible of realization until the *Skylark* had brought to them a supply of Rovolon, the metal of power. Now cities of metal were arising here and there above her waves, airplanes and helicop-

ters sped through and hovered in her atmosphere, barges and pleasure craft sailed the almost unbroken expanse of ocean which was her surface, immense submarine freighters bored their serenely stolid ways through her watery depths.

Sacner Carfon, the porpoiselike, hairless, naked Dasorian councilor, heaved his six and a half feet of height and his five hundredweight of mass into Dunark's vessel and greeted the Osnomian prince with a grave and friendly courtesy.

"Yes, friend, everything is wonderfully well with Dasor," he answered Dunark's query. "Now that our one lack, that of power, has been supplied, our lives can at last be lived to the full, unhampered by the limitations which we have hitherto been compelled to set upon them. But this from Norlamin is terrible news indeed. What know you of it?"

During the trip to Norlamin the three leaders not only discussed and planned among themselves, but also had many conferences with the Advisory Five of the planet toward which they were speeding, so that they arrived upon that ancient world with a complete knowledge of what they were to attempt. There Rovol and Drasnik instructed them in the use of fifth-order forces, each according to his personality and ability.

To Sacner Carfon was given high command, and he was instructed minutely in every detail of the power, equipment, and performance of the vessel which was to carry the hope of civilization. To Tarnan, the best balanced of his race, was given a more limited knowledge. Dunark and Urvan, however, were informed only as to the actual operation of the armament, with no underlying knowledge of its nature or construction.

"I trust that you will not resent this necessary caution," Drasnik said care-

fully. "Your natures are as yet essentially savage and bloodthirsty; your reason is all too easily clouded by passion. You are, however, striving truly, and that is a great good. With a few mental operations, which we shall be glad to give you at a later time, you shall both be able to take your places as leaders in the march of your peoples toward civilization."

FODAN, majestic chief of the Five, escorted the company of warriors to their battleship of space, and what a ship she was! Fully twice the size of *Skylark Three* in every dimension she lay there, surcharged with power and might, awaiting only her commander's touch to hurl herself away toward distant and now inimical Earth.

But the vengeful expedition was too late by far. DuQuesne had long since consolidated his position. His chain of interlinked power stations encircled the globe. Governments were in name only. World Steel now ruled the entire Earth and DuQuesne's power was absolute. Nor was that rule as yet unduly onerous. The threat of war was gone, the tyranny of gangsterism was done, everybody was working for high wages—what was there to kick about? Some men of vision of course perceived the truth and were telling it, but they were being howled down by the very people they were trying to warn.

It was thus against an impregnable fortified world that Dunark and Urvan directed every force with which their flying superdreadnought was armed. Nor was she feeble, this monster of the skyways, but DuQuesne had known well what form the attack would take and, having the resources of the world upon which to draw, he had prepared to withstand the amassed assault of a hundred such vessels—or a thousand.

Therefore the attack not only failed; it was repulsed crushingly. For from his massed generators DuQuesne hurled

out upon the Norlaminian space ship a solid beam of such incredible intensity that in neutralizing its terrific ardor her store of power-uranium dwindled visibly, second by second. So rapidly did the metal disappear that Sacner Carfon, after waging the unequal struggle for some twenty hours, put on high acceleration and drove back toward the Central System, despite the raging protests of Dunark and of his equally tempestuous fellow lieutenant.

And in his private office, which was also a complete control room, DuQuesne smiled at Brookings—a hard, thin smile. "Now you see," he said coldly. "Suppose I hadn't spent all this time and money on my defenses?"

"Well, why don't you go out and chase 'em? Give 'em a scare, anyway?"

"Because it would be useless," DuQuesne stated flatly. "That ship carries more stuff than anything we have ready to take off at present. Also, Dunark does not scare. You might kill him, but you can't scare him—it isn't in the breed."

"Well, what is the answer, then? You have tried to take Norlamin with everything you've got—bombs, automatic ships, and projectors—and you haven't got to first base. You can't even get through their outside screens. What are you going to do—let it go on as a stalemate?"

"Hardly!" DuQuesne smiled thinly. "While I do not make a practice of divulging my plans, I am going to tell you a few things now, so that you can go ahead with more understanding and hence with greater confidence. Seaton is out of the picture, or he would have been back here before this. The Fena-chrone are all gone. Dunark and his people are unimportant. Norlamin is the only known obstacle between me and the mastery of the Galaxy, therefore Norlamin must either be conquered or destroyed. Since the first alterna-

tive seems unduly difficult, I shall destroy her."

"Destroy Norlamin—how?" The thought of wiping out that world, with all its ancient culture, did not appall—did not even affect—Brookings' callous mind. He was merely curious concerning the means to be employed.

"This whole job so far has been merely a preliminary toward that destruction," DuQuesne informed him levelly. "I am now ready to go ahead with the second step. The planet Pluto is, as you may or may not know, very rich in uranium. The ships which we are now building are to carry a few million tons of that metal to a large and practically uninhabited planet not too far from Norlamin. I shall install driving machinery upon that planet and, using it as a projectile which all their forces cannot stop, I shall throw Norlamin into her own sun."

RAGING but impotent, Dunark was borne back to Norlamin; and, more subdued now but still bitterly humiliated, he accompanied Urvan, Sacner Carfon, and the various Firsts to a consultation with the Five.

As they strolled along through the grounds, past fountains of flaming color, past fantastically geometric hedges intricately and ornately wrought of noble metal, past walls composed of self-luminous gems so moving as to form fleeting, blending pictures of exquisite line and color, Sacner Carfon eyed Drasnik in unobtrusive signal and the two dropped gradually behind.

"I trust that you were successful in whatever it was you had in mind to do while we set up the late diversion?" Carfon asked quietly, when they were out of earshot.

Dunark and Urvan, his fierce and fiery aids, had taken everything that had happened at its face value, but not so had the leader. Unlike his lieutenants, the massive Dasorian had known

at first blast that his expedition against DuQuesne was hopeless. More, it had been clear to him that the Norlaminians had known from the first that their vessel, enormous as she was and superbly powerful, could not crush the defenses of Earth.

"We knew, of course, that you would perceive the truth," the First of Psychology replied as quietly. "We also knew that you would appreciate our reasons for not taking you fully into our confidence in advance. Tarnan of Osnome also had an inkling of it, and I have already explained matters to him. Yes; we succeeded. While DuQuesne's whole attention was taken up in resisting your forces and in returning them in kind, we were able to learn much that we could not have learned otherwise. Also, our young friends Dunark and Urvan, through being chastened, have learned a very helpful lesson. They have seen themselves in true perspective for the first time; and, having fought side by side in a common and so far as they knew a losing cause, they have become friends instead of enemies. Thus it will now be possible to inaugurate upon those two backward planets a program leading toward true civilization."

In the Hall of the Five the Norlaminian spokesman voiced thanks and appreciation for the effort just made, concluding:

"While as a feat of arms the expedition may not have been a success, in certain other respects it was far from being a failure. By its help we were enabled to learn much, and I can assure you now that the foe shall not be allowed to prevail—it is graven upon the sphere that civilization is to go on."

"May I ask a question, sir?" Urvan was for the first time in his bellicose career speaking diffidently. "Is there no way of landing a real storming force upon Earth? Must we leave DuQuesne in possession indefinitely?"

"We must wait, son, and work," the chief answered, with the fatalistic calm of his race. "At present we can do nothing more, but in time——"

He was interrupted by a deafening blast of sound—the voice of Richard Seaton, tremendously amplified.

"This is the *Skylark* calling Rovol of Norlamin—*Skylark* calling Rovol of Norlamin——" it repeated over and over, rising to a roar and diminishing to a whisper as Seaton's broadcaster oscillated violently through space.

Rovol laid a beam to the nearest transmitter and spoke: "I am here, son. What is it?"

"Fine! I'm away out here in——"

"Hold on a minute, Dick!" Dunark shouted. He had been humble and sober enough since his return to Norlamin, realizing as he never had before his own ignorance in comparison with the gigantic minds about him, the powerlessness of his entire race in comparison with the energies he had so recently seen in action. But now, as Seaton's voice came roaring in and Rovol and his brain-brother were about to indulge so naively and so publicly in a conversation which certainly should not reach DuQuesne's ears, his spirits rose. Here was something he could do to help.

"DuQuesne is alive, has Earth completely fortified, and is holding it against everything we can give him," Dunark went on rapidly. "He's got everything we have, maybe more, and he's undoubtedly listening to every word we're saying. Talk Mardonalian—I know for a fact that DuQuesne can't understand that. They've got an educator here and I'll give it to Rovol right now—all right, go ahead."

"I'm clear out of the Galaxy," Seaton's voice went on, now speaking the language of the Osnomian race which had so recently been destroyed. "So many Galaxies away that none of you except Orlon could understand the distance. The speed of transmission is

due to the fact that we have perfected and I am using a sixth-order projector, not a fifth. Have you a ship fit for really long-distance flight—as big as *Three* was, or bigger?"

"Yes; we have a vessel twice her size."

"Fine! Load her up and start. Head for the Great Nebula in Andromeda—Orlon knows what and where that is. That isn't very close to my line, but it will do until you get some apparatus set up. I've got to have Rovol, Drasnik, and Orlon, and I would like to have Fodan; you can bring along anybody else that wants to come. I'll sign on again in an hour—you should be started by then."

BESIDES the four Norlaminians mentioned, Caslor, First of Mechanism, and Astron, First of Energy, also elected to make the stupendous flight, as did also many "youngsters" from the Country of Youth. Dunark would not be left behind, nor would adventurous Urvan. And lastly there was Sacner Carfon the Dasorian, who remarked that he "would have to go along to make the boys behave and to steer the ship in case the old professors forgot to." The space ship was well on its way when at the end of the hour Seaton's voice again was heard.

"All right, put me on a recorder and I'll give you the dope," he instructed, when he had made sure that his signal was received.

"DuQuesne has been trying to put a ray on us and he may try to follow us," Dunark put in.

"Let him," Seaton shot back grimly, then spoke in English: "DuQuesne, Dunark says that you're listening in. You have my urgent, if not cordial, invitation to follow this Norlaminian ship. If you follow it far enough, you'll take a long, long ride, believe me!"

Again addressing the voyagers, he recounted briefly everything that had oc-

curred since the abandonment of *Skylark Three*, then dived abruptly into the fundamental theory and practical technique of sixth-order phenomena and forces.

Of that ultramathematical dissertation Dunark understood not even the first sentence; Sacner Carfon perhaps grasped dimly a concept here and there. The Norlaminians, however, sat back in their seats, relaxed and smiling, their prodigious mentalities not only absorbing greedily but assimilating completely the enormous doses of mathematical and physical science being thrust upon them so rapidly. And when that epoch-making, that almost unbelievable, tale was done, not one of the aged scientists even referred to the tape of the recorder.

"Oh, wonderful—wonderful!" exclaimed Rovol in ecstasy, his transcendental imperturbability broken at last. "Think of it! Our knowledge extended one whole order farther in each direction, both into the small and into the large. Magnificent! And by one brain, and that of a youth. Extraordinary! And we may now traverse universal space in ordinary time, because that brain has harnessed the practically infinite power of cosmic radiation, a power which exhausted the store of uranium carried by *Skylark Three* in forty hours. Phenomenal! Stupendous!"

"But do not forget that the brain of that youth is a composite of many," said Fodan thoughtfully, "and that in it, among others, were yours and Dunark's. Seaton himself ascribes to that peculiar combination his successful solution of the problem of the sixth order. You know, of course, that I am in no sense belittling the native power of that brain. I am merely suggesting that perhaps other noteworthy discoveries may be made by superimposing brains in other, but equally widely divergent, fields of thought."

"An interesting idea, truly, and one

which may be fruitful of result," assented Orlon, the First of Astronomy, "but I would suggest that we waste no more time. I, for one, am eager to behold with my own inner consciousness the vistas of the Galaxies."

Agreeing, the five white-bearded scientists seated themselves at the multiplex console of their fifth-order installation and set happily to work. Their gigantic minds were undaunted by the task they faced—they were only thrilled with interest at the opportunity of working with magnitudes, distances, forces, objects, and events at the very contemplation of which any ordinary human mind would quail.

Steadily and contentedly they worked on, while at the behest of their nimble and unerring fingers there came into being the forces which were to build into their own vessel a duplicate of the mechano-electrical brain which actuated and controlled the structure, almost of planetary proportions, in which Seaton was even then hurtling toward them. Hurtling with a velocity rapidly mounting to a value incalculable; driven by the power liberated by the disintegrating matter of all the suns of all the Galaxies of all the universes of cosmic space!

XXIII.

WITH all their might of brain and skill of hand and with all the resources of their fifth-order banks of forces, it was no small task for the Norlaminians to build the sixth-order controlling system which their ship must have if they were to traverse universal space in any time short of millenia. But finally it was done.

A towering mechano-electrical brain almost filled the mid-section of their enormous sky rover, the receptors and converters of the free energy of space itself had been installed, and their intratomic space-drive, capable of developing an acceleration of only five light-veloci-

ties, had been replaced by Seaton's newly developed sixth-order cosmic-energy drive which could impart to the ship and its entire contents, without jolt, jar, or strain, any conceivable, almost any calculable, acceleration.

For many days the Norlaminian vessel had been speeding through the void at her frightful maximum of power toward the *Skylark of Valeron*, which in turn was driving toward our Galaxy at the same mad pace. Braking down now, since only a few thousand light-years of distance separated the hurtling flyers, Seaton materialized his image at the brain control of the smaller cruiser and thought into it for minutes.

"There, we're all set!" In the control room of the *Skylark* Seaton laid aside his helmet and wiped the perspiration from his forehead in sheer relief. "The trap is baited and ready to spring—I've been scared to death for a week that they'd tackle us before we were ready for them."

"What difference would it have made?" asked Margaret curiously. "Since we have our sixth-order screens out they couldn't hurt us, could they?"

"No, Peg; but keeping them from hurting us isn't enough—we've got to capture 'em. And they'll have to be almost directly between Revol's ship and ours to make that capture possible. You see, we'll have to send out from each vessel a hollow hemisphere of force and surround them. If we had only one ship, or if they don't come between our two ships, we can't bottle them up, because they have exactly the same velocity of propagation that our own forces have.

"Also, you can see that our projector can't work direct on more than a hemisphere without cutting its own beams, and that we can't work through relay stations because, fast as relays are, the Intellectuals would get away while the relays were cutting in. Any more questions?"

"Yes; I have one," put in Dorothy. "You told us that this artificial brain of yours could do anything that your own brain could think of, and here you've got it stuck already and have to have two of them. How come?"

"Well, this is a highly exceptional case," Seaton replied. "What I said would be true ordinarily, but now, as I explained to Peg, it's working against something that can think and act just as quickly as it can."

"I know, dear, I was just putting you on the spot a little. What are you using for bait?"

"Thoughts. We're broadcasting them from a point midway between the two vessels. They're keen on investigating any sixth-order impulses they feel, you know—that's why we've kept all our stuff on tight beams heretofore, so that they probably couldn't detect it—so we're sending out a highly peculiar type of thought, that we are pretty sure will bring them in from wherever they are."

"Let me listen to it, just for a minute?" she pleaded.

"W-e-l-l—I don't know." He eyed her dubiously. "Not for a minute—no. Being of a type that not even a pure intellectual can resist, they'd burn out any human brain in mighty short order. Maybe you might for about a tenth of a second, though."

He lowered a helmet over her expectant head and snatched it off again, but that moment had been enough for Dorothy. Her violet eyes widened terribly in an expression commingled of amazingly poignant horror and of dreadfully ecstatic fascination.

"Dick—Dick!" she shrieked; then, recovering slowly: "How horrible—how ghastly—how perfectly, exquisitely damnable! What is it? Why, I actually heard babies begging to be born! And there were men who had died and gone to heaven and hell; there were minds that had lost their bodies and didn't know what to do—were simply



Her whole body trembled violently. "Oh, Dick, Dick!" she gasped. "How horrible!"

shrieking out their agony, despair, and utter, unreasoning terror for the whole universe to hear! And there were joys, pleasures, raptures, so condensed as to be almost as unbearable as the tortures. And there were other things—awful, terrible, utterly indescribable and unimaginable things! Oh, Dick, I was sure that I had gone stark, staring, raving crazy!"

AST-10

"Sall right, dear," Seaton reassured his overwrought wife. "All those things are really there, and more. I told you it was bad medicine—that it would tear your brain to pieces if you took much of it."

SEATON paused, weighing in his mind how best to describe the really indescribable signal that was being

broadcast by the Brain, then went on, choosing his words with care:

"All the pangs and all the ecstasies, all the thoughts and all the emotions of all evolution of all things, animate and inanimate, are there; of all things that ever have existed from the unknowable beginning of infinite time and of all things that ever shall exist until time's unknowable end. It covers all animate life, from the first stirring of that which was to vitalize the first unicell in the slime of the first world ever to come into being in the cosmos, to the last cognition of the ultimately last intelligent entity ever to be.

"Our present humanity was of course included, from before conception, through birth, through all of life, through death, and through the life beyond. It covers inanimate evolution from the ultimate particle and wave, through the birth, life, death, and rebirth of any possible manifestation of energy and of matter, up to and through the ultimate universe.

"Neither Mart nor I could do it all. We carried everything as far as we could, then the Brain went through with it to its logical conclusion, which of course we could not reach. Then the Brain systematized all the data and reduced it to a concentrated essence of pure thought. It is that essence which is being broadcast and which will certainly attract the Intellectuals. In the brief flash you got of it you probably could understand at all only the human part—but maybe it's just as well."

"I'll say it's just as well!" Dorothy emphatically agreed. "I wouldn't listen to that again, even for a millionth of a second, for a million dollars—but I wouldn't have missed it for another million, either. I don't know whether to beg you to listen to it, Peggy, or to implore you not to."

"Don't bother," Margaret replied positively. "Anything that could throw you into such a hysterical tantrum as

that did, I don't want any of at all. None at all, in fact, it would be altogether too much for—"

"Got them, folks—all done!" Seaton exclaimed. "You can put on your headsets now."

A signal lamp had flashed brightly and he knew that those two gigantic brains, working in perfect synchronism, had done instantaneously all that they had been set to do.

"Are you dead sure that they got them all, Dick?"

"Absolutely, and they got them in less time than it took the filament of the lamp to heat up. You can bank on it that all seven of them are in the can. I go off half cocked and make mistakes, but those Brains don't—they can't."

Seaton was right. Though far away, even as universal distances go, the Intellectuals had felt that broadcast thought and had shot toward its source at their highest possible speed. For in all their long lives and throughout all their cosmic wanderings they had never encountered thoughts of such wide scope, such clear cogency, such tremendous power.

The discarnate entities approached the amazing pattern of mental force which was radiating so prodigally and addressed it; and in that instant there were shot out curvingly from each of the mechano-electrical brains a gigantic, hemispherical screen.

Developing outwardly from the two vessels as poles with the unimaginable velocity possible only to sixth-order forces, the two cups were barriers impenetrable to any sixth-order force, yet neither affected nor were affected by the gross manifestations which human senses can perceive. Thus Solar Systems, even the neutronium cores of stars, did not hinder their instantaneous development.

Hundreds of light-years in diameter though they were, the open edges of those semiglobes of force met in perfect

alignment and fused smoothly, effortlessly, instantaneously together to form a perfect, thought-tight sphere. The violently radiating thought-pattern which had so interested the Intellectuals disappeared, and at the same instant the ultrasensitive organisms of the entities were assailed by the to them deafening and blinding crash and flash of the welding together along its equator of the far-flung hollow globe.

These simultaneous occurrences were the first intimations that everything was not what it appeared, and the disembodied intelligences flashed instantly into furious activity, too late by the smallest possible instant of time. The trap was sprung, the sphere was impervious at its every point, and, unless they could break through that wall, the Intellectuals were incarcerated until Seaton should release his screens.

WITHIN the confines of the globe there were not a few suns and thousands of cubic parsecs of space upon whose stores of energy the Intellectuals could draw. Wherefore they launched a concerted attack upon the wall, hurling against it all the force they could direct. But they were not now contending against the power of any human, organic, finite brain. For Seaton's mind, powerfully composite though it was of the mightiest intellects of the First Galaxy, was only the primary impulse which was being impressed upon the grids and was being amplified to any desirable extent by the almost infinite power of those two cubic miles of coldly emotionless, perfectly efficient, mechano-electrical artificial Brains.

Thus against every frantic effort of the Intellectuals within it the sphere was contracted inexorably, and as it shrank, reducing the volume of space from which the prisoners could draw energy, their struggles became weaker and weaker. When the ball of force was only a few

hundred miles in diameter and the two vessels were relatively at rest, Seaton erected auxiliary stations around it and assumed full control.

Rapidly then the prisoning sphere, little larger now than a toy balloon, was brought through the inoson wall of the *Skylark* and held motionless in the air above the Brain room. A complex structure of force was built around it, about which in turn there appeared a framework of inoson, supporting sixteen massive bars of uranium.

Seaton took off his helmet and sighed. "There, that'll hold them for a while, I guess."

"What are you going to do with them?" asked Margaret.

"Darned if I know, Peg," he admitted ruefully. "That's been pulling my cork ever since we figured out how to catch them. We can't kill them and I'm afraid to let them go, because they're entirely too hot to handle. So in the meantime, pending the hatching out of a feasible method of getting rid of them permanently, I have simply put them in jail."

"Why, Dick, how positively brutal!" Dorothy exclaimed.

"Yeah? There goes your soft heart again, Red-Top, instead of your hard head. I suppose it would be positively O. K. to let them loose, so that they can dematerialize all four of us? But it isn't as bad as it sounds, because I've got a stasis of time around them. We can leave them in there for seventeen thousand million years and even their intellects won't know it, because for them no time at all shall have lapsed."

"No-o-o—of course we can't let them go scot-free," Dorothy admitted, "but we—I should—well, maybe couldn't you make a bargain with them to give them their liberty if they will go away and let us alone? They're such free spirits, surely they would rather do that than stay bottled up there forever."

"Since they are purely intellectual and hence immortal, I doubt very much if they'll dicker with us at all," Seaton replied. "Time doesn't mean a thing to them, you know; but since you insist I'll check the stasis and talk it over with them."

A tenuous projection, heterodyned upon waves far below the band upon which the captives had their being, crept through the barrier screen and Seaton addressed his thoughts to the entity known as "One."

"Being highly intelligent, you have already perceived that we are vastly more powerful than you are. Living in the flesh possesses many advantages over an immaterial existence. One of these is that it permitted us to pass through the fourth dimension, which you cannot do because your patterns are purely three-dimensional and inextensible. While in hyperspace we learned many things. Particularly we learned much of the really fundamental natures and relationships of time, space, and matter, gaining thereby a basic knowledge of all nature which is greater, we believe, than any that has ever before been possessed by any three-dimensional being.

"Not only can we interchange matter and energy as you do in your materializations and dematerializations, but we can go much farther than you can, working in levels which you cannot reach. For instance, I am projecting myself through this screen, which you cannot do because the carrier wave is far below your lowest attainable level.

"With all my knowledge, however, I admit that I cannot destroy you, since you can shrink as nearly to a mathematical point as I can compress this zone, and its complete coalescence would of course liberate you. Upon the other hand, you realize your helplessness inside that sphere. You can do nothing about it since it cuts off your sources of power.

"I can keep you imprisoned therein as long as I choose. I can set upon it forces which will keep you imprisoned until this two-hundred-kilogram ingot of uranium has dwindled down to a mass of less than one milligram. Knowing that the half-life period of that element is approximately five times ten to the ninth years, you can calculate for yourself the length of time during which you shall remain incarcerated.

"My wife, however, has a purely sentimental objection to confining you thus, and wishes to make an agreement with you whereby we may set you at liberty without endangering our own present existences. We are willing to let you go if you will agree to leave this universe forever. I realize, of course, that you are beyond either sentiment or passion and are possessed of no emotions whatever. Realizing this, I give you a choice, upon purely logical grounds, thus:

"Will you leave us and our universe alone, to work out our own salvation or our own damnation, as the case may be, or shall I leave you inside that sphere of force until its monitor bars are exhausted? Think well before you reply; for, know you, we all prefer to exist for a short time as flesh and blood rather than for all eternity as fleshless and immaterial intelligences. Not only that—we intend so to exist and we shall so exist!"

"We shall make no agreements, no promises," One replied. "Yours is the most powerful mind I have encountered—almost the equal of one of ours—and I shall take it."

"You just *think* you will!" Seaton blazed. "You don't seem to get the idea at all. I am going to surround you with an absolute stasis of time, so that you will not even be conscious of imprisonment, to say nothing of being able to figure a way out of it, until certain more pressing matters have been taken

care of. I shall then work out a method of removing you from this universe in such a fashion and to such a distance that if you should desire to come back here the time required would be, as far as humanity is concerned, infinite. Therefore it must be clear to you that you will not be able to get any of our minds, in any circumstances."

"I had not supposed that a mind of such power as yours could think so mud-dily," One reproved him. "In fact, you do not so think. You know as well as I do that the time with which you threaten me is but a moment. Your Galaxy is insignificant, your universe is but an ultramicroscopic mote in the cosmic all. We are not interested in them and would have left them before this had I not encountered your brain, the best I have seen in substance. That mind is highly important and that mind I shall have."

"But I have already explained that you can't get it, ever," protested Seaton, exasperated. "I shall be dead long before you get out of that cage."

"More of your purposely but uselessly confused thinking," retorted One. "You know well that your mind shall never perish, nor shall it diminish in vigor throughout all time to come. You have the key to knowledge, which you will hand down through all your generations. Planets, Solar Systems, Galaxies, will come and go, as they have since time first was; but your descendants will be eternal, abandoning planets as they age to take up their abodes upon younger, pleasanter worlds, in other systems and in other Galaxies—perhaps even in other universes."

"And I do not believe that I shall lose as much time as you think. You are bold indeed in assuming that your mind, able as it is, can imprison mine for even the brief period we have been discussing. At any rate, do as you please—we will make neither promises nor agreements."

XXIV.

IMMENSE as the Norlaminian vessel was, getting her inside the planetoid was a simple matter to the Brain. Inside the *Skylark* a dome bulged up, driving back the air; a circular section of the multilayered wall disappeared; Rovol's space-torpedo floated in; the wall was again intact; the dome vanished; the visitor settled lightly into the embrace of a mighty landing cradle which fitted exactly her slenderly stupendous bulk.

The Osnomian prince was the first to disembark, appearing unarmed; for the first time in his warlike life he had of his own volition laid aside his every weapon.

"Glad to see you, Dick," he said simply, but seizing Seaton's hand in both his own, with a pressure that said far more than his words. "We thought they got you, but you're bigger and better than ever—the worse jams you get into, the stronger you come out."

Seaton shook the hands enthusiastically. "Yeah, 'lucky' is my middle name—I could fall into a vat of glue and climb out covered with talcum powder and smelling like a bouquet of violets. But you've advanced more than I have," glancing significantly at the other's waist, bare now of its wonted assortment of lethal weapons. "You're going good, old son—we're all behind you!"

He turned and greeted the other newcomers in cordial and appropriate fashion, then all went into the control room.

During the long flight from Valeron to the First Galaxy no one paid any attention to course or velocity—a handful of cells in the Brain piloted the *Skylark* better than any human intelligence could have done it. Each Norlaminian scientist studied rapturously new vistas of his specialty: Orlon the charted Galaxies of the First Universe, Rovol the minutely small particles and waves of

the sixth order, Astron the illimitable energies of cosmic radiation, and so on.

Seaton spent day after day with the Brain, computing, calculating, thinking with a clarity and a cogency hitherto impossible, all to one end. What should he do, what *could* he do, with those confounded Intellectuals? Crane, Fodan, and Drasnik spent their time in planning the perfect government—planetary, systemic, galactic, universal—for all intelligent races, wherever situated.

Sacner Carfon studied quietly but profoundly with Caslor of Mechanism, adapting many of the new concepts to the needs of his aqueous planet. Dunark and Urvan, their fiery spirits now subdued and strangely awed, devoted themselves as sedulously to the arts and industries of peace as they formerly had to those of war.

Time thus passed quickly, so quickly that, almost before the travelers were aware, the vast planetoid slowed down abruptly to feel her cautious way among the crowded stars of our Galaxy. Though a mere crawl in comparison with her inconceivable intergalactic speed, her present pace was such that the stars sped past in flaming lines of light. Past the double sun, one luminary of which had been the planet of the Fenachrone, she flew; past the Central System; past the Dark Mass, whose awful attraction scarcely affected her cosmic-energy drive—hurtling toward Earth and toward Earth's now hated master, DuQuesne.

DuQuesne had perceived the planetoid long since, and his robot-manned ships rushed out into space to do battle with Seaton's new and peculiar craft. But of battle there was none; Seaton was in no mood to trifle. Far below the level of DuQuesne's screens, the cosmic energies directed by the Brain drove unopposed upon the power bars of the space fleet of Steel and that entire fleet exploded in one space-filling flash of blinding brilliance. Then the

Skylark, approaching the defensive screens, halted.

"I know that you're watching me, DuQuesne, and I know what you're thinking about, but you can't do it." Seaton, at the Brain's control, spoke aloud. "You realize, don't you, that if you clamp on a zone of force it'll throw the Earth out of its orbit?"

"Yes; but I'll do it if I have to," came back DuQuesne's cold accents. "I can put it back after I get done with you."

"You don't know it yet, big shot, but you are going to do exactly nothing at all!" Seaton snapped. "You see, I've got a lot of stuff here that you don't know anything about because you haven't had a chance to steal it yet, and I've got you stopped cold. I'm just two jumps ahead of you, all the time. I could hypnotize you right now and make you do anything I say, but I'm not going to—I want you to be wide awake and aware of everything that goes on. Snap on your zone if you want to—I'll see to it that the Earth stays in its orbit. Well, start something, you big, black ape!"

THE SCREENS of the *Skylark* glowed redly as a beam carrying the full power of DuQuesne's installations was hurled against them—a beam behind which there was the entire massed output of Steel's world-girdling network of superpower stations. But Seaton's screens merely glowed; they did not radiate even under that Titanic thrust. For, as has been said, this new *Skylark* was powered, not by intra-atomic energy, but by the cosmic energy liberated by all the disrupting atoms in all the suns of all the Galaxies of all the universes. Therefore her screens did not radiate; in fact, the furious blasts of DuQuesne's projectors only increased the stream of power being fed to her receptors and converters.

The mighty shields of the planetoid

took every force that DuQuesne could send, then Seaton began to compress his zones, leaving open only the narrow band in the fourth order through which the force of gravitation makes itself manifest. Not only did he leave that band open, he so blocked it open that not even DuQuesne's zones of force, full-driven though they were, could close it.

In their closing those zones brought down over all Earth a pall of darkness of an intensity theretofore unknown. It was not the darkness of any possible night, but the appalling, absolute blackness of the utter absence of every visible wave from every heavenly body. As that unrelieved and unheralded blackness descended, millions of Earth's humanity went mad in unspeakable orgies of fright, of violence, and of crime.

But that brief hour of terror, horrible as it was, can be passed over lightly, for it ended forever any hope of world domination by any self-interested man or group, paving the way as it did for the heartiest possible reception of the government of right instead of by might so soon to be given to Earth's peoples by the sages of Norlamin.

Through the barriers both of mighty space ship and of embattled planet Seaton drove his sixth-order projection. Although built to be effective at universal distances the installation was equally efficient at only miles, since its control was purely mental. Therefore Seaton's image, solid and visible, materialized in DuQuesne's inner sanctum—to see DuQuesne standing behind Dorothy's father and mother, a heavy automatic pistol pressed into Mrs. Vaneman's back.

"That'll be all from you, I think," he sneered. "You can't touch me without hurting your beloved parents-in-law and you're too tender-hearted to do that. If you make the slightest move toward me all I've got to do is to touch the trigger. And I shall do that, any-

way, right now, if you don't get out of this System and stay out. I am still master of the situation, you see."

"You are master of nothing, you murderous baboon!"

Even before Seaton spoke the first word his projection had acted. DuQuesne was fast, as has been said, but how fast are the fastest of human nervous and muscular reactions when compared with the speed of thought? DuQuesne's retina had not yet registered the fact that Seaton's image had moved when his pistol was hurled aside and he was pinioned by forces as irresistible as the cosmic might from which they sprang.

DuQuesne was snatched into the air of the room—was surrounded by a globe of energy—was jerked out of the building through a welter of crushed and broken masonry and concrete and of flailing, flying structural steel—was whipped through atmosphere, stratosphere, and empty space into the control room of the *Skylark of Valeron*. The inclosing shell of force disappeared and Seaton hurled aside his controlling helmet, for he knew that his iron self-control was fast giving way. He knew that wave upon wave of passion, of sheer hate, was rising, battering at the very gates of his mind; knew that if he wore that headset one second longer the Brain, actuated by his own uncontrollable thoughts, would passionlessly but mercilessly exert its awful power and blast his foe into nothingness before his eyes.

Thus at long last the two men, physically so like, so unlike mentally, stood face to face; hard gray eyes, staring relentlessly into unyielding eyes of midnight black. Seaton was in a towering rage; DuQuesne, cold and self-contained as ever, was calmly alert to seize any possible chance of escape from his present predicament.

"DuQuesne, I'm telling you something," Seaton gritted through clenched

teeth. "Prop back your ears and listen. You and I are going out in that projector. You are going to issue 'cease firing' orders to all your stations and tell them that you're all washed up—that a humane government is taking things over."

"Or else?"

"Or else I'll do, here and now, what I've been wanting to do to you ever since you shot up Crane's place that night—I will scatter your component atoms all the way from here to Valeron."

"But, Dick——" Dorothy began to protest.

"Don't butt in, Dot!"

Stern and cold, Seaton's voice was one his wife had never before heard. Never had she seen his face so hard, so bitterly implacable.

"Sympathy is all right in its place," Seaton went on, "but this is the showdown. The time for dealing tenderly with this piece of mechanism in human form is past. He has needed killing for a long time, and unless he toes the mark quick and careful he'll get it, right here and right now.

"And as for you, DuQuesne," turning again to the prisoner, "for your own good I'd advise you to believe that I'm not talking just to make a noise. This isn't a threat, it's a promise—get me?"

"You couldn't do it, Seaton, you're too——" Their eyes were still locked, but into DuQuesne's there had crept a doubt. "Why, I believe you *would*!" he exclaimed.

"I'll tell the cockeyed universe I will!" Seaton barked. "Last chance! Yes or no?"

"Yes." DuQuesne knew when to back down. "You win—temporarily at least," he could not help adding.

THE PROJECTION went out and the required orders were given. Sunlight, moonlight, and starlight again bathed the world in wonted fashion.

DuQuesne sat at ease in a cushioned chair, smoking Crane's cigarettes; Seaton stood scowling blackly, hands jammed deep into pockets, addressing the jury of Norlaminians.

"You see what a jam I'm in?" he complained. "I could be arrested for what I think of that bird. He ought to be killed, but I can't do it unless he gives me about half an excuse, and he's darn careful not to do that. So what?"

"The man has a really excellent brain, but it is slightly warped," Drasnik offered. "I do not believe, however, that it is beyond repair. It may well be that a series of mental operations might make of him a worth-while member of society."

"I doubt it." Seaton still scowled. "He'd never be satisfied unless he was all three rings of the circus. Being a big shot isn't enough—he's got to be the whole works, a regular Poo-Bah. He's naturally antisocial—he would always be making trouble and would never fit into a really civilized world. He *has* got a wonderful brain; but he isn't human—— Say, that gives me an idea!" His corrugated brow smoothed magically, his boiling rage was forgotten.

"DuQuesne, how would you like to become a pure intellect? A bodiless intelligence, immaterial and immortal, pursuing pure knowledge and pure power throughout all cosmos and all time, in company with seven other such entities?"

"What are you trying to do, kid me?" DuQuesne sneered. "I don't need any sugar coating on my pills. You are going to take me on a one-way ride—all right, go to it, but don't lie about it!"

"No; I mean it. Remember the one we met in the first *Skylark*? Well, we captured him and six others, and it's a very simple matter to dematerialize you so that you can join them. I'll bring them in, so that you can talk to them yourself."

The Intellectuals were brought into

the control room, the stasis of time was released, and DuQuesne—via projection—had a long conversation with One.

"That's the life!" he exulted finally. "Better a million times over than any possible life in the flesh—the ideal existence! Think you can do it without killing me, Seaton?"

"Sure I can—I know both the words and the music."

DuQuesne and the caged Intellectuals poised in the air, Seaton threw a zone around cage and man, the inner zone of course disappearing as the outer one went on. DuQuesne's body disappeared—but not so his intellect.

"That was the first really bad mistake you ever made, Seaton," the same sneering, domineering, icily cold DuQuesne informed Seaton's projection in level thought. "It was bad because you can't ever remedy it—you *can't* kill me now! And now I *will* get you—what's to hinder me from doing anything I please?"

"I am, bucko," Seaton informed him cheerfully. "I told you quite a while ago that you'd be surprised at what I could do, and that still goes as it lays. But I'm surprised at your rancor and at the survival of your naughty little passions. What d'you make of it, Drasnik? Is it simply a hangover, or may it be permanent in his case?"

"Not permanent, no," Drasnik decided. "It is only that he has not yet become accustomed to his changed state of being. Such emotions are definitely incompatible with pure mentality and will disappear in a short time."

"Well, I'm not going to let him think even for a minute that I slipped up on his case," Seaton declared. "Listen, you. If I hadn't been dead sure of being able to handle you I would have killed you instead of dematerializing you. And don't get too cocky about my not being able to kill you yet, either, if it comes to that. It shouldn't be im-

possible to calculate a zone in which there would be no free energy whatever, so that you would starve to death. But don't worry, I'm not going to do it unless I have to."

"Just what do you think you *are* going to do?"

"See that miniature space ship there? I am going to compress you and your new playmates into this spherical capsule and surround you with a stasis of time. Then I am going to send you on a trip. As soon as you are out of the Galaxy this bar here will throw in a cosmic-energy drive—not using the power of the bar itself, you understand, but only employing its normal radiation of energy to direct and to control the energy of space—and you will depart for scenes unknown with an acceleration equal to the sixth power of the velocity of light. You will travel at that acceleration until this small bar is gone. It will last approximately ninety thousand million years, which, as One will assure you, is but a moment.

"Then these large bars, which will still be big enough to do the work, will rotate your capsule into the fourth dimension. This is desirable, not only to give you additional distance, but also to destroy any orientation you may have remaining, in spite of the stasis of time and the not inconsiderable distance already covered. When and if you get back into three-dimensional space you will be so far away from here that you will certainly need most of what is left of eternity to find your way back here." Then, turning to the ancient physicist of Norlamin: "O. K., Rovol?"

"An exceedingly scholarly bit of work," Rovol applauded.

"It is well done, son," majestic Fodan gravely added. "Not only is it a terrible thing indeed to take away a life, but it is certain that the unknowable force is directing these disembodied mentalities in the engraving upon the

sphere of a pattern which must forever remain hidden from our more limited senses."

Seaton thought into the headset for a few seconds, then again projected his mind into the capsule.

"All set to go, folks?" he asked. "Don't take it too hard—no matter how many millions of years the trip lasts, you won't know anything about it. Happy landings!"

The tiny space-ship prison shot away, to transport its contained bodiless intelligences into the indescribable immensities of the superuniverse; of the cosmic all; of that ultimately infinite space which can be knowable, if at all, only to such immortal and immaterial, to such incomprehensibly gigantic, mentalities as were theirs.

EPILOGUE

THE erstwhile overlord and his wife sat upon an ordinary davenport in their own home, facing a fireplace built by human labor, within which nature-grown logs burned cracklingly. Dorothy wriggled luxuriously, fitting her gorgeous auburn head even more snugly into the curve of Seaton's mighty shoulder, her supple body even more closely into the embrace of his brawny arm.

"It's funny, isn't it, lover, the way things turn out? Space ships and ordinary projectors and forces and things are all right, but I'm awfully glad that you turned that horrible Brain over to the Galactic Council in Norlamin and said you'd never build another. Maybe I shouldn't say it, but it's ever so much nicer to have you just a man again, instead of a—well, a kind of a god or something."

"I'm glad of it, too, Dorothy mine—I couldn't hold the pose. When I got so mad at DuQuesne that I had to throw away the headset I realized that I never

could get good enough to be trusted with that much dynamite."

"We're both really human, and I'm glad of it. It's funny, too," she went on dreamily, "the way we jumped around and how much we missed. From here across thousands of Solar Systems to Osnome, and from Norlamin across thousands of Galaxies to Valeron. And yet we haven't seen either Mars or Venus, our next-door neighbors, and there are lots of places on Earth, right in our own back yard, that we haven't seen yet, either."

"Well, since we're going to stick around here for a while, maybe we can catch up on our local visitings."

"I'm glad that you are getting reconciled to the idea; because where you go I go, and if I can't go you can't, either, so you've got to stay on Earth for a while, because Richard Ballinger Seaton the Second is going to be born right here, and not off in space somewhere!"

"Sure he is, sweetheart. I'm with you, all the way—you're a blinding flash and a deafening report, dear little girl friend, and, as I may have intimated previously, I love you."

"Just as I love you—it's wonderful, isn't it, how supremely happy you and I are? I wish more people could be like us—more of them will be, too, won't they, after this new planetary government has shown them what coöperation can do?"

"They're bound to, dear. It'll take time, of course—racial hates and fears cannot be overcome in a day—but the people of our old Earth are not too dumb to learn."

Auburn head close to brown, they stared into the flickering flames in silence; the wonderfully satisfying silence of perfect comradeship, perfect sympathy, perfect understanding, perfect and perfected love.

For these two the problems of life were few and small.

Let's Get Down to BRASS TACKS



AN OPEN FORUM OF CONTROVERSIAL OPINION

Answering The Challenge Of "The Irrelevant"

Dear Editor:

I am going to enforce the Law of Conservation of Energy, as Karl Van Campen asks some one to do. His sentence, "If the ship was traveling ten feet a second relative to earth, and the push was one thousand pounds, then those ten pounds of fuel did ten thousand foot pounds of work," is untrue. No energy, if the ship was free of gravitational attractions (which aren't mentioned), would be necessary to keep the ship *traveling* at this or any other speed below that of light. Mr. Van Campen's mistake is that he disregards Newton's law of dynamics which states that a mass, unaffected by any force, tends to travel in a straight line at a constant velocity. (Relativity substitutes "geodesic" for "straight line.") No energy is necessary to maintain this velocity. His formula for the work done by the fuel gives it credit for moving the ship, whereas it would have moved anyway. The fuel, in reality, accelerated the ship to a higher speed. The energy formulae for the acceleration would be strictly according to the Law of Conservation of Energy.

His idea of an armature in a space ship in an orbit around the earth to generate power would also follow that law. If the magnetic drag on the armature was the only force stopping the ship, he would get back just as much energy in the form of electric power before the space ship slowed down and returned to earth as he expended in rocket fuel in establishing it in its orbit. But if he went to Jupiter, then he would get more energy than he expended, if he didn't bring the ship back.—Clyde McCrary, 6825 Weedln Place, Seattle, Washington.

Dear Editor:

This is my first contribution to the house of wit, half-wit, and everybody's opinion. I have never taken the trouble to write to this magazine before, or to any magazine, so I had better tell you why I exerted myself. There are two reasons: the story *The Irrelevant*, in the December issue, and my honest opinion of the magazine.

That story caused me more thought than any I have ever read, and the results of the mental gymnastics concerned I am giving you. Except for the blasphemous title, the publication itself brings to my mind the words "better," "quality," "friendliness," and I write this letter because I write to a friend. These words express my unconscious thoughts after reading the magazine for about a year; not my reaction from a few good stories. I am praising the magazine not to get my letter printed (although I certainly want the readers to know my answer to Mr. Van Campen's challenge about *The Irrelevant*) but because there is a reason for it. I have never seen this reason stated, although it is a fundamental one.

Among the pulp magazines those that sell for 20c are always better than the 25c ones, and also contain more material. Why? The 25c ones are admittedly poorer in circulation because the higher price gives a maximum profit from each of a small number of sales. If they had the popularity of the 20c ones they certainly would give more material for the higher price. Therefore the 20c magazine *must* be better if its circulation provides for the decrease in profit.

I have taken physics and have apprenticed in chemistry (I am a junior college student), so when I say that it is easy to arrive at false conclusions when working on a problem by failing to remember an important fact, I mean it. I have experienced this many times, although the subject is perfectly familiar to me. I believe Mr. Van Campen has done the same. In the story the author states that a rocket ship is being propelled by gases pushing with a force of 1000 lbs. When the ship travels 10 ft. per second relative to the earth the gases do 10×1000 or 10,000 ft. lbs. of work per second. At the 10 miles per second $5,280 \times 1000$ or 52,800,000 ft. lbs. of work are done per second. More work is done, so more energy is derived from the same quantity of gases. I don't believe it.

Work is measured as the product of the force times the distance it moves the object it is pushing. The force is either (1)—overcoming the inertia of the object, that is, accelerating its motion, or (2)—overcoming the resistance of motion (pushing the rocket ship through a medium of molasses). In the latter case the propelling force acts to *maintain* the motion;

without it the vehicle would stop. The farther the ship would travel per second through masses the greater the work done to maintain the motion for that distance. But the rocket follows case (1) as it is going through free space and the force propelling it increases the speed, not maintains it. Disregarding gravity, when the force is stopped the ship ceases to accelerate but the only work done is that of acceleration which is the same at any speed and requires the same power output.

The author may answer me with this: The ship is actually going more distance using the same amount of fuel when going faster, so must be saving fuel. All I have to say is that the physicist that fails to account in his calculations for the fact that less fuel is used per mile when going faster is no physicist. The problem is just one more x in the equation. Calculating the angle of take off and the time of month and day to arrive at the destination is much more difficult than that of speed and acceleration.—Raphael Ehat, 804 Fell Street, San Francisco, Calif.

Dear Editor:

As I see it, the problem raised by Mr. Van Campen in his "challenge," and in his story, *The Irrelevant*, in no way confutes or has any bearing on the Law of Conservation of Energy. It involves only the definition of work.

For example, assume that a man is running at a speed of ten miles an hour along a train which is going forty. While he is laded traveling fifty miles an hour relative to the earth, he is performing only the amount of work necessary to running ten miles an hour, which speed is relative to the train. And his metabolism may be quite normal—he need derive no unshared energy from his food, the fuel that he burns.

Exactly the same principle, it appears to me, applies to the rocket ship. The author justly denies us the right to measure its velocity relative to any celestial body for the purpose of determining the amount of work it is doing. But we must measure the velocity relative to the gases against which the propelling impulse is delivered. Work might be further defined as the force times the relative distance through which it operates. Or else as the force times the distance through which it operates—against a given opposition. It strikes me as singular that these amendments would not have occurred tacitly to the wizard in the story. Maybe I'm crazy.—J. P. McCormack, 106 Bellevue North, Seattle, Washington.

Dear Editor:

I guess it is up to me to try to tear *The Irrelevant* to pieces. In the first place, the analogy of the automobile is all wet. Acceleration equals, I believe, mass times the energy exerted. Therefore, you must take into account the mass of the car. If the car weighs one thousand pounds, and it can exert one thousand foot pounds of work per second, it will accelerate at a rate of one foot per second per second, disregarding the fact of the retreating ground, which is where the connection with the rest of the story comes in. Campen says: "If the ship was traveling ten feet per second with relation to the earth, and the push was one thousand pounds, then the ten pounds of fuel did ten thousand foot pounds of work." That is entirely fallacious. A foot-pound is defined as the work exerted when one pound is lifted a distance of one foot. Thus, if the ship weighed one thousand pounds, and the ten pounds of fuel lifted it ten feet, then the fuel would be doing ten thousand foot pounds of work. But, as the gravity decreases as you go higher, the higher the ship went, the more work the fuel would be able to do. Then Campen says: "But if the ship happened to be going ten miles a second, then those same gases would be doing 5,280,000 foot pounds of work." That is also wrong. They would do nothing of the kind. All that would happen is that the speed of the ship

would be increased a certain amount, according to the energy in the fuel and mass of the ship. Then he says that the ship was traveling fifteen thousand miles a second in relation to the nebulae. Well, what of it? He was traveling at that speed before he ever started on the trip. All his rocket would do would be to increase or decrease that speed a little, depending upon the direction it was going. Also, Campen prattles about relative speeds. That means nothing. Speed can easily be calculated in relation to the largest body near, in relation to the speed at which one was traveling before one started, in relation to light; and, if you want to go into a little more abstract physics, in relation to the ether. In other words, the story is absolutely meaningless, and the same thing goes for it that I said for *Infesure*. It amazes me. I am just a high-school student, haven't even had physics yet. All the physics I ever had is what I got from reading science-fiction, and I can detect what a bunch of college professors couldn't even see through. I wonder what they were doing the night before they read that story. I also wonder what the editors were doing.—M. A. Rothman, 2500 N. 5th St., Philadelphia, Pa.

And "The Irrelevant" Replies

Dear Editor:

The letters are most interesting. I am delighted by the answers—but not satisfied. In the first place, remember, please, that these propositions have all been worked over by physicists who are supposed to know their stuff. Three M. I. T. graduates among them. Four college professors of physics. So don't expect to knock it over like a straw man. It's really a tough act.

Rothman has suggested that I can measure the velocity relative to any large body near by, or if I "want to go into a little more abstract physics, in relation to the ether." Rothman is off the track there. Michelson-Morley's classic experiment was designed to measure the earth's velocity relative to the ether, and was highly important in showing that that was absolutely, utterly and completely impossible, meaningless and without an answer. Einstein started off from that, and all the Theory of Relativity is based on that one fact, really; that there is no absolute velocity, no velocity with respect to space, or the ether.

So far as taking the velocity with respect to some large body—o. k.—go ahead. That's what I did, and then you run into the Law of Conservation and break it. The only thing you can take the velocity relative to without breaking that law, is the discharged gases at the instant of discharge. And then the ship doesn't accelerate at all. You can't use the gases previously discharged, because you proceed to run into the same difficulty you would if you picked the earth. So either you break the law, or you don't do anything at all but squirt gases from "a painted ship on a painted ocean."

But most of the letters have kicked on the fact that the work must be done on something—work must accomplish something, overcome gravity, inertia, or resistance of the medium.

The answer is, I consider it overcoming inertia alone. There is no medium-resistance in space. For the purposes of the problem we neglect gravity.

Then my proposition was actually stated somewhat inaccurately. That was done for simplicity. If I calculate the mass of the ship, I could determine the acceleration produced by the 1000 pound force, and so the velocity at the end of the second. But I can also state the problem thus (I will review the thing, and you can see that the acceleration need not bother our calculations): In a certain given second, the ship moves so as to traverse ten feet, while thrusting with a force of 1000 pounds. Then by the formula of definition of work, $W = F \times S$, the work done is 10,000 foot pounds. In a certain later second the

motion of the ship is such that 10,000 feet are traversed in a given second. Then by the same definitive formula, the work done is 10,000,000 foot pounds. That eliminates the question of acceleration during the second by defining the motion so as to take care of that. The work is done against inertia.

I'm doing some work now in connection with automobiles, and I can assure Mr. Ehat that the acceleration and work done at various speeds is not a constant. The modern automobile is so designed as to overcome this to as great an extent as possible, because the horsepower of a gasoline engine increases as the speed of the engine increases, since it takes in fuel more rapidly, and burns it more rapidly, at higher speeds. Thus though the horsepower needed to maintain a given acceleration increases constantly, the increasing horsepower of the automobile overcomes this. The power of an automobile engine is always defined as xx horsepower at 3,800 r.p.m. But at 380 r.p.m. the horsepower may not be more than one or two. The two factors cancel, and hide the facts from the driver. It is easy to calculate the power required to maintain acceleration, however, and watch the rise.

At one foot per second, to increase the velocity one foot a second, with a mass of two units (two to cancel the $\frac{1}{2}$ in the $\frac{1}{2}MV^2$ formula) three units of K.E. must be added in an acceleration of one foot per second per second is wanted. To increase to three f. p. s. five units are added in a second, and so on according to the little table given.

Second	Velocity	Velocity Increase	Kinetic Energy Increase Per Second
0	1	0	0
1	2	1	4
2	3	1	9
3	4	1	16
4	5	1	25
5	6	1	36
6	7	1	49
7	8	1	64
8	9	1	81
9	10	1	100

The first second it does 3 ft. lbs. per second; the second, 5, the third, 7, the fourth, 9, etc.

Then, to maintain a given acceleration is proof in itself of increasing horsepower. But a constant force must mean a constant acceleration if the mass does not change, and an increasing acceleration if the mass diminishes. Do you deny that a rocket will maintain a constant acceleration with a constant fuel consumption?

A moment more to Mr. Rothman: A foot pound is not defined as the work needed to lift one pound one foot. That's variable, thanks to earth's variable gravity. It's better to define it as a force of one pound acting through a distance of one foot. Know what a "poundal" is? Or a "mass of one slug"? They are necessary units devised to get around some of the insane difficulties of our insane "English" system of weights and measures. Know what the weight of a one-gram mass is? It is not, strictly speaking, one gram. It varies, but its about 980 dynes here. It's about 978 in Para, and about 982 in Nome.

That's about all, I guess. Except that I must answer that crack Mr. Ehat made about fuel combustion and physicists by replying that the physicist that thinks he can go faster with less fuel and maintain acceleration is no physicist—he's an optimist.—Karl Van Campen.

Dear Editor:

Greetings to Karl Van Campen for his letter in the December number. It was even more interesting than his story.

It is the writer's opinion that there are too many "Sacred Cows" and too much "mumbo jumbo" in the halls of science. Occurrences which run counter to accepted theories are simply denied and declared as "impossible," "happenings," "humbings," "fakes," etc. Theories

are declared as "absolute truths" only to be conveniently forgotten if proven false. I maintain that all advance in knowledge results only from such facts which do run counter to accepted theories. As to open-mindedness, I've found the "scientific mind" a pretty closed affair. The value of books like "Lo!/" lies in the assembly of facts which are uncomfortable to the Sacred Cows. It might wake up one or two of them.

Van Campen mentions the difference between the atoms of physics and those of chemistry. I know that the real hydrogen atom contains 9 electrons and 9 protons which combine into 9 neutrons. And just the other day I read the claim of a physicist that the hydrogen atom contains 1800 electrons alone. Now another wallop at the physicists: They explain an electric current in a conductor as a stream of electrons racing through it at the speed of light or near it. Electrons shot out of cathodes by high electric pressures only obtain speeds which are small fractions of the speed of light. Just another theory gone haywire. My explanation of the nature of electricity: A warping of the atoms, or rather, of the fields of atoms. It will simplify a lot of explanations of electric phenomena.

The value of a magazine of our type, if properly run, can not be overestimated. At its best it is a forum of the rebels against the Sacred Cows, a forum for independent thinkers. We all know that the majority of "scientific work" consists of quoting "authorities." Which led to several nice scandals when some practical joker manufactured a ring of authoritative quotations. Van Campen evidently does not see the Joker in his brain-teaser. There is an absolute reference velocity in this universe: "The natural rate of vibration of the ether." It is this natural wave length which gives light, magnetism, electricity, etc., its natural velocity. Take a space ship leaving earth and its field of gravity. It started out with a relative velocity against the ether. As the ether is the real universe, all changes in velocity are relative to it. This ether is so incredibly dense that even the densest stars are only holes in it. Just turn the accepted theories of matter upside down and we might go some place. The secret of gravity, indispensable to spatial navigation, the secret of forces undreamt of are locked in this ether. But I shudder when I think of those secrets becoming known to us, as they will just be used to bring about bigger wars. No, I'm neither physicist nor chemist, just an old bore thinking for himself and dabbling now and then in metaphysics.—F. G. Hehr, Box 875, Sayville, N. Y.

Suggestions

Dear Editor:

I have put off writing this letter for a long time, but I have at last decided that whether I will or no, my humble contribution goes to you (and also to the wastebasket, I fear).

1—Astounding Stories as a whole is the best magazine on the market, and people who claim otherwise show lack of taste.

2—Artistically, the covers are fine, but how about getting some that pertain more directly to the stories? Usually, I have quite a task discovering from just what portion of a story a cover was taken.

3—I have nothing to say about the edges or size because I buy the magazine for what's in it and nothing else.

4—Brass Tacks is a really enjoyable department. I wonder, though, if it would be a practical idea to have an editor's note under each letter, commenting on its contents.

5—Serials are all right when not dealt out too freely.

6—I find that your stories tend to harp rather too much on hackneyed themes such as earth-demolishing wars once in a while. Fortunately, this does not occur too often.

7—Interplanetary stories are getting pain-

fully rare, and I do wish that some would appear in the very near future.

8—How about having an occasional feature magazine (say, once a year) devoted to only one type of story, e. g., an issue composed solely of interplanetary stories?

9—I am in favor of Astounding Stories Quarterly. Astounding Stories coming out twice a month, and in fact, any device whereby I may get our "mag" more times a year.—Isaac Asimov, 1312 Decatur St., Brooklyn, N. Y.

Ballot Wanted

Dear Editor:

I don't suppose this will be published, but here goes, anyway.

When are you going to put in the story ballot for the readers to vote on? You can easily squeeze it in at the end of some story or other, and it will leave a great deal of space in Brass Tacks for letters that are more interesting than the ones that just classify the stories.

How about a quarterly? I think most of the readers would rather have a quarterly than have the magazine go semi-monthly, and I don't think you can do both—even with the galaxy of fine writers who contribute to your magazine.

Old Faithful was the best story of the issue, because it seemed so natural. There's not a chance in a million of Martian life being like that of earth, as most of the authors make it. No. 774 was a unique hero, who did not overcome the tremendous obstacles of the story as easily as most of the stereotyped heroes do. The ending was swell, too.

If anybody between fifteen and nineteen years of age outside of the U. S. would like to correspond with me, I promise I will try to answer all letters.—Arthur L. Widner, Jr., 79 Germain Ave., Quincy, Massachusetts.

They Gave It Praise

Dear Editor:

It seems to be getting more and more difficult to place the stories in order of merit, so I won't attempt to do it in this letter. Instead of having one good story and the rest fair, poor, etc., Astounding Stories goes other science-fiction magazines one better and has them all good with but few exceptions. I hope the readers give *Old Faithful*, by Raymond Z. Gallum, plenty of praise as it is one of the best pieces of science-fiction yet turned out. It's a story I will read more than once and a story I will never forget. It shows that action is not always necessary to make a good story. *The Irrelevant* is the best of the shorts. Another tale I'll read again and again.—Jack Darrow, 4224 N. Sawyer Avenue, Chicago, Ill.

Did You Like Weinbaum's Stories?

Dear Editor:

Now that *Lo!* Charlee Fort's heterogeneous agglomeration of irrelevant and incoherent facts (?) has finally come to a welcome end, it is high time for suggestions to start coming in for something better to take its place. In the October issue, some one asked for author biographies. I would like to second this motion and, at the same time, make an effort to round it out into something worth printing. In the first place, these author biographies should really be autobiographies. This will make the articles take on a personal aspect, which we fans should eat up. You could even make a sort of Author-Fan Department out of this space. The section might be headed by your usual informal talk, followed by some author's autobiography. Little, not too technical, sci-

entific articles by authors and readers could then be used to round out the department. Such material would be accepted as free contributions. No addresses would be printed in this column so that all discussion would be confined to it alone. In other words, what I am asking for is a department devoted to facts—not fiction, not science-fiction, not super-science. What I am looking for is a sort of open discussion of what science can do, or should be able to do, to-day, but somehow never seems to get around to. Not what it will do in the future. Each contributor would have to dig out some little known but true scientific fact, and show, plausibly, just how such a thing could be used to create a marvelous new machine, process or material. Sophistry should not be barred. More than half the fun would lie in finding out and uncovering fallacious reasoning, if it happens to be present.

About the magazine itself, I'd like to say that Brass Tacks is better than ever. The reader's departments are the only reason that I buy the other magazines occasionally. However, I can truthfully say that I read almost every story in each issue of Astounding Stories, so they ought to be good. So many years of science-fiction have soured me somewhat, so that when I say that I can still come up smiling after an Astounding story, I figure that's a pretty good compliment. One request: Try to get a fellow by the name of Stanley G. Weinbaum to write stories for us.—William S. Sykora, 31-51 41st Street, Long Island City, N. Y.

A Rip Snorter

Dear Editor:

Your November issue up to standard as usual. When are you going to come out twice monthly and also give us a quarterly? (But only give us a quarterly if you keep up to standard!) One of your "rivals" came out with a real "rip snorter" this month. A fixed tube for traveling from earth to moon—in spite of the fact that such a system would show a relative difference of speed at the moon end of 30,000 m.p.h. And that is called science. I am dropping my subscriptions to the other two magazines if you will oblige by a bi-monthly and quarterly.—Dr. W. A. Gibson, Rowanbank, Bathgate, West Lothian, Scotland.

A Request

Dear Editor:

In the latter part of 1933 many readers of Astounding Stories received an announcement circular of a new science-fiction magazine—Unusual Stories. Although the projected magazine was never published, the announcement circulars have themselves become collectors' items; and we are very anxious to obtain a number of copies. We sincerely hope that any one having them will communicate with us.—Science Fiction Syndicate, 509 West 26th Street, Austin, Texas.

A Hint

Dear Editor:

In my eyes there has been a vast improvement in Astounding Stories since Street & Smith took it over.

As a hint to any of the readers of your magazine who save each issue, if about an eighth of an inch is cut off the cover edge, the magazine keeps in better condition. Also, pasting the first page to the cover saves the magazine.

Yours for a bigger and better magazine.—Ira Melville Schey, Jr., Lawrence Academy, Groton, Massachusetts.

**We Hardly Think That That Story
Would Have Appeared In The Old
"Astounding."**

Dear Editor:

Science-fiction has reached the point of collapse and the end of my patience.

Readers frequently condemn the old "blood-and-thunder" yarns—well, strange as the fact may seem to you, I love those old classics, am disgusted now with these stories that brandish such worthless trash as super-pseudo-science. I sit back and dream of my favorites, among which I number:

"Hawk Carse," "Commander John Hanson stories," Hamilton's "Sargasso of Space" and "Monsters of Mars," Burk's "Earth, the Marauder" and those two unsurpassable masterpieces, "Dark Moon," and "Brood of the Dark Moon." Oh, how I love those old favorites of mine! To-day, there isn't one science-fiction magazine that prints such wonderful fiction. All three of your rivals are striving for something new, something different. Don't you realize that you can't find any better plots and backgrounds than those used in the old time science-fiction?

I agree with Joseph Hatch of Kansas, who says to give us another magazine containing only sheer flights of fantasy wherein the author may go to any limit—minus any complicated scientific facts or theories!

Mr. Editor, there are two classes of science-fiction fans. Those who read it for ideas and want theories to work on, and those who read it for enjoyment, and who want description, color and character in their stories. I am of the latter class, and undoubtedly so is Mr. Hatch. I believe that there are countless others, too, who prefer fiction to science. So, dear editor, why not put out another magazine, as Mr. Hatch suggests, printing in it stories that will be "up the alley" of science-fiction lovers, and print in *Astounding Stories*, stories for the science-fiction lovers. Thus you would please both classes. So instead of printing *Astounding Stories* twice a month, why not print two different magazines, eh? Think it over. Let the readers vote on it if necessary, but for Heaven's sake, see what you can do about it.

I consider the best story in the new *Astounding Stories* to be *The Bright Illusion* by Miss Moore.—Ed Camille, R. F. D. No. 7, Erie, Pennsylvania.

**More Expected From Mr. Williamson
Soon**

Dear Editor:

I am one of the younger generation that reads *Astounding Stories* (twelve years old). I was interested in this magazine by the efforts of a friend, the beginning of this year, and I haven't missed a copy since. Jack Williamson is my favorite, and by the way, what's happened to him? I should like to congratulate Donald Wandrei on *Oolossus Eternal*. Let's have more like it. I am also for the much-wanted quarterly. I shall close with the hopes of greater success for our magazine.—Lawrence Deverett, Park David Hotel, Long Beach, New York.

Back Numbers

Dear Editor:

I have for disposal the magazines containing Part II of *Skylark of Space*, and all three parts of *Skylark Three*.

I also have the following issues of *Astounding Stories* for sale, or trade.

1930—February, April, June, July, August, December.

1931—January, February, March, June through December.

1932—January through June, September, November.

1933—January.

Please print this for the benefit of those wanting these issues.—Paul Poulson, 19 Byron Avenue, Ansonia, Conn.

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**says
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DEAN
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